Asset Management Plan

Roads, Bridges and Structural Culverts, Water Distribution, Sanitary Collection, Water and Sewage Treatment Plants

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December 11, 2013

Executive Summary

The Township of South Stormont recognizes that in order to sustain services for its residents and for the competitiveness of its businesses, agriculture and industry, it must manage the Township's assets cost effectively. McIntosh Perry and Allan Chartered Accountants were commissioned by the Township to develop the Asset Management Plans for the Road Network, Bridges and Structural Culverts, Water Distribution System, Sanitary Sewer Collection System, as well as Sewage and Water Treatment Plants.

The findings for individual infrastructure varied, as follows:

The **Road Network** requires additional spending to avoid network deterioration and optimize its overall condition rating (Section 3.1).

Significant spending has been done to replace the aging **Bridge** infrastructure, which is reflected in the average bridge age of 24 years. The **Structural Culverts** are slightly older with an average age of 29 years. Of note here is that during the next 30 years, a significant number of culverts will be coming up for renewal (Section 3.2).

The Township's **Water Distribution System** is holding strong, as an analysis of the age distribution and average remaining service life of the Township's watermains shows that, although a portion of the system is in the later stages of its expected service life, none of the watermains will reach the end of their expected service life within the time forecasted by this report (Section 3.3).

Sanitary Sewer Collection Systems present in Ingleside and Long Sault carry an overall structural condition rating as "Good" (Section 3.4).

The plan defines the average rating for **Water and Sewage** as "Good" while the overall physical condition (replacement-cost weighted) of South Stormont's **Water and Sewage Treatment** infrastructure is "Average". However, at this time, the Township has yet to develop levels of service for its water and wastewater treatment plants. As an initial step, it is recommended that the Township adopt approved plant capacity as an assessment criterion (Section 3.5).

The Township of South Stormont's overall plan takes a long-view perspective which focuses on timely maintenance and rehabilitation to save money in the long term. Not only does the plan outline infrastructure sustainability, but it provides strategies on how to finance the operation, maintenance, renewal and expansion of the system, taking into account asset preservation.

It is important to note that the overall Asset Management Strategy (Section 4.0) states the biggest risk to the Township is inadequate spending. The consequences of underfunding include the deterioration of assets and service levels. It is recommended that the Township explore a variety of procurement methods to ensure the most economical allocation of the Township's resources (Section 4.6).

In addition, the plan suggests strategies to help mitigate some of the spending shortfall, including adoption of a 10-Year Capital Plan for Road Reconstruction and completing additional work included in the report as funds become available.

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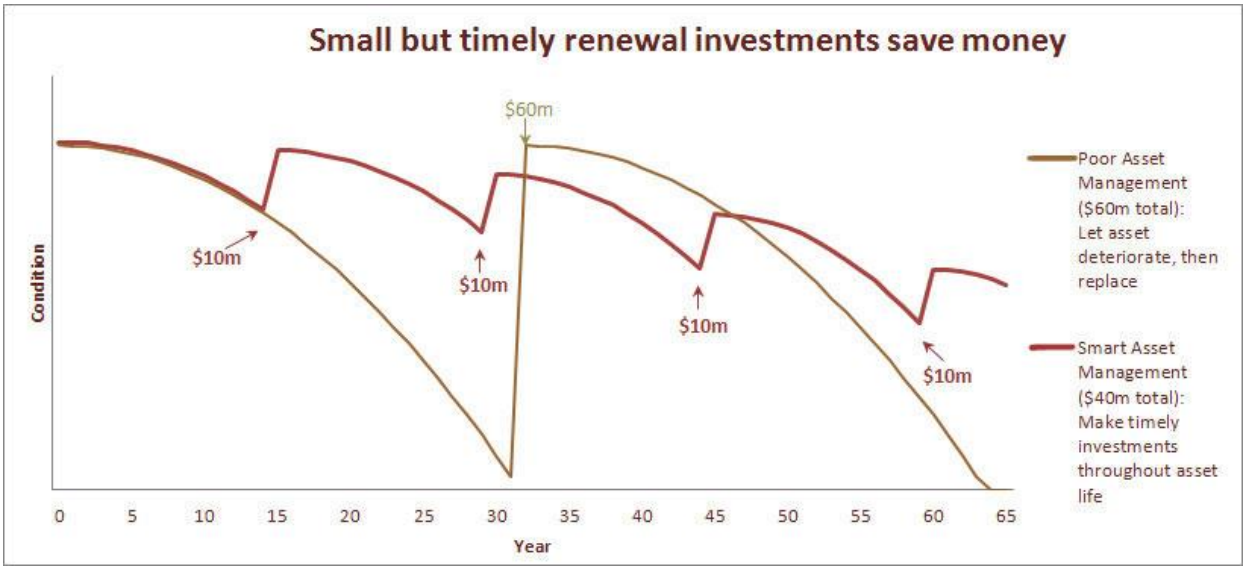
1.0 INTRODUCTION

The Township recognizes that in order to sustain services for its residents and for the competitiveness of its businesses, agriculture and industry, it must manage the Township's assets cost effectively. The 2013 Strategic Plan was developed in order to guide future economic prosperity for the region that is both appropriate and sustainable. As a result, the Township is developing Asset Management Plans for its road network, bridges and structural culverts, water distribution system, sanitary and storm sewer collection system, water and sewage treatment plants and buildings. Once the plans are developed for the various components of the infrastructure, the Township will assimilate and synthesize the information into a comprehensive plan.

The asset management plan is a comprehensive plan that inventories and assesses the infrastructure and develops a plan to best maintain it. The plan outlines how to sustain the infrastructure and provides strategies on how to finance the operation, maintenance, renewal and expansion of the system. In doing so, it takes into account timely maintenance and capital repairs in order to best preserve the asset, while maintaining the desired levels of service to the public. The plan takes a long-view perspective on managing the asset through life cycle cost analysis which can save money in the long term. For example, Figure 1 shows two ways to manage an asset.

FIGURE 1 – LIFE CYCLE OF TWO RENEWAL OPTONS



(Resource from "Building Together, Guide for Municipal Asset Management Plans", Ministry of Infrastructure, Ontario)

The first option in Figure 1 allows the asset to deteriorate until it needs to be replaced, while the second option shows timely rehabilitation. At the end of the 64-year life cycle, Option 1 costs $120 million (the initial investment plus the cost to replace the asset) and Option 2 costs $100 million. Even so, the asset's condition

in Option 2 is in far better shape than in Option 1. McIntosh Perry Consulting Engineers Ltd. and Allan Chartered Accountants were commissioned by the Township to work with Senior Municipal Staff and Council to develop the Asset Management Plan for the Road Network, Bridges and Structural Culverts, Water Distribution System, Sanitary Sewer Collection System, as well as the Sewage and Water Treatment Plants. The Plan is to be presented to Council and will also be made available to the public for its information and input. The Asset Management Plan covers a period of 10 years in which the document is to be updated every five years. The update will be an opportunity to evaluate the assumptions made in this study and how the plan is maintaining and improving these systems and meeting service-level targets.

1.1 STUDY METHODOLOGY

1.1.1 *Road Network*

The Ministry of Transportation of Ontario "Inventory Manual for Municipal Roads for Small Lower Tier Municipalities" has been used in preparing this study and is briefly outlined in the sections below.

1. All road sections are listed with their condition rating by road type:

    A. Earth Roads (Listed in inventory but not rated. Typically, these roads have little or no maintenance, only used seasonally.)

    B. Gravel Roads

    C. Surface Treated or Low Class Bituminous (LCB) Roads

    D. Hot Mix Paved or High Class Bituminous (HCB) Roads

2. With the exception of Earth Roads, future condition ratings are calculated for each road and from this, predicted maintenance and capital expenditures can be produced. Newly reconstructed roads have a 10-point condition rating, and roads requiring partial reconstruction are assigned three points. Roads should not be allowed to go below three points due to the severity of the road conditions, e.g. very poor ride, difficult to maintain, usually a safety hazard.

    Generally speaking, the Township roads have low traffic volumes, which are consistent throughout its road network. It has been assumed that asphalt roads will need to be resurfaced within 15 years and if not resurfaced, then reconstructed in 30 years. Note that roads cannot perpetually be resurfaced and at some point the road must be reconstructed. It has been assumed that a surface treated road has a life expectancy of approximately 15 years before reconstruction is required.

    The above-noted life cycle assumptions should not have a great impact on the overall assessment of the road network, but some roads may experience slower or faster rates of deterioration. The capital program may need to be adjusted to account for this and other factors such as variations in pavement structure, sub-surface conditions, drainage and truck traffic. For example, a street scheduled for reconstruction in year five may have to be moved up in the five-year capital program. On the other hand, a street scheduled for year three could be pushed back since its condition has not deteriorated as fast as earlier predicted.

    Through regularly measuring the performance of its road system (e.g. Road Needs Study every five years, traffic counts, etc.), the Township will be able to better predict the deterioration rates of individual segments and therefore the overall network.

The condition rating for each road type will decrease every year unless maintenance and/or rehabilitation are performed. For gravel roads it is assumed that the condition of the road will be maintained with regular gravel resurfacing. Hard surface roads with no maintenance and/or no rehabilitation (which is not recommended) will need reconstruction within 15 years for surface treated roads and 30 years for asphalt roads. The following calculations show the rate of deterioration of the three surface types.

Gravel: No change in rating with regular maintenance.

Surface Treatment: $$\frac{10 - 3 \text{ point condition rating}}{15 \text{ year life cycle before reconstructing}} = 0.47 \text{ pt/yr}$$

Asphalt: $$\frac{10 - 3 \text{ point conditions rating}}{30 \text{ year life cycle before reconstructing}} = 0.23 \text{ pt/yr}$$

Based on the foregoing discussion, Table 1 provides an example of how the condition rating is forecasted for each surface type. In this example, it is assumed that road reconstruction was performed in the Base Year for each road type.

TABLE 1 – FORECASTING CONDITION RATING EXAMPLE

SURFACE TYPE	BASE YEAR	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
GRAVEL[1]	10.00	10.00	10.00	10.00	10.00	10.00
SURFACE TREATMENT	10.00	9.53	9.06	8.59	8.12	7.65
APHALT	10.00	9.77	9.54	9.31	9.08	8.85

[1]Gravel Roads have a stable unchanging life expectancy, as long as routine loose top maintenance is performed. Gravel roads will remain this way until improvements are made.

3. The average condition rating is determined for each road type by summing the product of length multiplied by the condition rating and then dividing by the total length of the road system. This will result in an average condition rating for the three road surface types. An example is demonstrated in Table 2 below.

TABLE 2 – AVERAGE CONDITION RATING BY SURFACE TYPE EXAMPLE

STREET	LENGTH (L) (Km)	CONDITION RATING (CR)	PRODUCT L x CR
1	1.00	7.00	7.00
2	2.00	3.00	6.00
3	3.00	5.00	15.00
TOTAL	**6.00**		**28.00**

$$\text{Average Condition Rating} = \frac{\text{SUM (L} \times \text{CR)}}{\text{Total Length}} = \frac{28.00}{6.00} = 4.70$$

An overall condition rating can be calculated for the total Municipal system by combining the three surface types.

4. The above noted analysis will determine if and when a road requires improvements within the next 10 years.

5. To estimate the cost of construction, benchmark costs are used and are associated with the type of capital improvement. Average unit costs have been developed based on local construction costs.

   Fixed costs are costs associated with maintenance of the existing road system and include overhead, salaries, etc. Fixed costs are generally met from the Township's budget prior to capital construction funds being allocated. Fixed costs for forecast requirements were derived from historical expenditures.

   For future capital expenditures, the report presents cost estimates in 2013 dollars. At the time of budgeting, the Township should adjust capital expenditure by an appropriate cost of inflation.

   The 10-year capital program presented in this report is a tool for Municipal Staff and Council in selecting the 10-year program. As mentioned above, there may be other factors that must be considered and/or adjusted in order to reflect changes not foreseen at the time of writing this report.

1.1.2 *Bridges and Structural Culverts*

Detailed visual inspections are done in accordance with the Ontario Structure Inspection Manual. The thorough visual inspection is performed regularly and is a "close-up" visual assessment (with estimation of some remaining inaccessible parts) of each element for material defects, performance deficiencies and maintenance needs of the structure. The inspection may involve some non-destructive testing such as using hammers to sound concrete. The inspector under the direction of the engineer measures and records information on prescribed forms, in which the engineer develops a program for rehabilitation and/or replacement for the municipal infrastructure.

All bridges with a span of 3 metres or greater must be inspected biennially. For culverts with three (3) to six (6) metre spans, the inspection interval may be increased from two to four years if the culvert is in good condition and it is the engineer's belief that the condition of the culvert will not change significantly before the next inspection. The inspection frequency identified above is the maximum interval for structures in good condition and/or repair. The engineer may require more frequent inspections for some of the reasons listed below:

- Structure with a high proportion of elements in poor condition,
- Structure with a load limit,
- Single load path structures,
- Structures with fatigue-prone details, and
- Structures with fractured critical components.

In addition, some structures may require a more thorough inspection by actually getting within arm's reach of all areas of the structure. This type of inspection is referred to as an Enhanced OSIM inspection and requires the following:

- Determine areas of delamination and spalling in concrete elements by tapping with a hammer.
- Determine limits of rot in wood elements by tapping with a hammer and selective wood coring.
- Cleaning and wire brushing all areas of steel to examine section loss.

Typically an enhanced inspection is required on all structures over 30 years of age with critical components in poor condition and should be completed a maximum of every six years.

1.1.3 *Water Distribution System*

InfraGuide, Innovations and Best Practices for Developing a Water Distribution System Renewal Plan (November 2003) has been used to develop the plan for the water distribution main and appurtenances: hydrants, valves and water services. The primary objective of a renewal plan (rehabilitation and replacement) for distribution mains is to minimize their life-cycle costs, while the primary objective of a renewal plan for transmission mains is to minimize failures.

A comprehensive water distribution system renewal plan includes:

- Systematic approach to inventory and assessing the infrastructure,
- Identifiable level of service,
- Cost calculations to renew the infrastructure,
- Risk and mitigation measures, and
- Financial plan.

The following goals of the plan are:

- Protect public health and safety,
- Minimize life cycle costs,
- Minimize risks,
- Ensure revenues are efficiently spent to sustain the infrastructure, and
- Identify backlog of needs.

The top-down approach has been selected based on the available information on the water distribution system. This approach projects the renewal costs for a given class of infrastructure and assumed life-expectancy, while being consistent with the accrual accounting method currently in place. As the system ages, further studies on the system are recommended in which more detailed inventories and analysis will be made on each aspect of the water distribution system. This will assign condition numbers and deterioration rates for each asset. This approach is called bottom-up, and typically takes several years to develop. As the information is collected for the bottom-up approach, the top-down approach can be updated and refined until the bottom-up approach is fully implemented.

The top-down approach is developed through:

1. Inventory System
   - Length of pipes by size, material type and age,
   - Number of hydrants by age,
   - Number of values by size and age,
   - Number of services by size, material type and age, and
   - Number of water services by size and age.

2. Benchmark Costing
   Benchmark costs are developed for each asset.

3. Condition
   For the top-down approach, age is used to assess condition. Note that age is not always the best way to assess the condition of infrastructure. Over time the following information should be collected on the pipes: lining, coating, and environmental, such as soil type. Benchmark costs are developed for each asset.

4. Select Renewal Option
   The following are the typical renewal options used for water distribution mains:
   - Open cut,
   - Trenchless techniques,
   - Non-structural lining of unlined iron mains, and
   - Cathodic protection.

   Hydrants, valves and services are typically replaced when the water main is replaced.

5. Life-cycle Analysis
   For the top-down approach the remaining life of the asset is the life expectancy less the age. Life expectancy is based on industry standards for materials and environmental conditions, such as soils.

6. Capital Costs
   The capital costs are estimated for each asset requiring renewal within the next 10 years.

1.1.4 *Sanitary Sewer Collection System*

The Asset Management Plan for Sewers has been developed based on "Assessment and Evaluation of Storm and Wastewater Collection Systems", A Best Practice by the National Guide to Sustainable Municipal Infrastructure (July 2004). The Best Practice is a step-by-step process to develop a program to maintain and rehabilitate the sewer infrastructure in order to deal with the problems before they become failures.

A comprehensive renewal plan includes:

- Systematic approach to inventory and assessing the infrastructure,
- Identifiable level of service,
- Cost calculations to renew the infrastructure,
- Risk and mitigation measures, and
- Financial plan.

The following are the goals of the plan:

- Protect public health and safety,
- Minimize life cycle costs,
- Minimize risks,
- Ensure revenues are efficiently spent to sustain the infrastructure, and
- Identify backlog of needs.

The majority of the collection and conveyance for a sewer system is through gravity flows. A properly designed system will have sufficient velocity for self-cleaning and thus reduce on-going maintenance costs for flushing and monitoring. Typical issues with sewer systems are:

- Structural failure such as cracked, broken or collapsed pipes because of material failure due to age and poorly constructed infrastructure,
- Inadequate Hydraulic Capacity due to:
    - Surface and/or ground water entering into a sewer system (applicable to sanitary sewers),
    - Sump pumps and/or basement weeping tiles connected to the sewer (applicable to sanitary sewers),
    - Cross-connections of storm services and catch basins (applicable to sanitary sewers),
    - Increased growth or drainage areas not properly accommodated through upsizing downstream pipes,
    - Reduced cross-section due to calcite, roots and debris build-up, and
    - Reverse grades and/or sags.

The above deficiencies can lead to sewer back-ups, environmental spills and sink holes.

The methodology is presented below:

1. Inventory System

    A. Physical Data
        1. Pipe length, diameter, material type, age, direction of flow, slope and depth of bury,
        2. Maintenance hole size, age and inverts, and
        3. Service connection size, material type and age.

    B. Operational Data
    Inventory of complaints from residents or logs from maintenance staff concerning:

        - Basement flooding,
        - Blockage,
        - Sewer surcharge, and
        - Bad odours.

    C. Environmental Data
        1. Source of Flows: residential, commercial or industrial,
        2. Population, and
        3. Catchment area.

2. Benchmark Costing
Benchmark costs are developed for each asset.

3. Investigations
On-going investigations are necessary in order to assess the condition of the sewer. There are a number of methods to assess the conditions of the pipe network in which closed-circuit television is recommended every five years and more frequently for critical pipes in the network such as trunk sewers and pipes with on-going maintenance issues. Other investigations such as flow monitoring, smoke testing, dye testing, etc. are for investigating specific issues with the system.

4. Condition Assessment
The assessment focuses on three components once the investigations are completed:

    A. Structural Integrity of Asset
        - Fracture
        - Crack
        - Deformation
        - Collapse
        - Broken pipe

- Joint displacement/opening
- Surface damage
    - Local buckling
    - Corrosion
    - Spalling
    - Wear
- Sag

B. Functional Integrity of Service Connections
- Roots
- Infiltration
- Encrustation
- Debris
- Obstruction
- Water level
- Protruding services

C. Hydraulic Capacity
- Theoretical Loading Factor (TLF) is the peak theoretical flow divided by the pipe capacity. Low TLF identifies potential pipes with increased maintenance due to low flows.
- Grade Line Factor (GLF) is the maximum hydraulic grade line based on theoretical or historical storm events. GLF identifies where surcharges may flood basements or cause environmental spills through maintenance hole covers, for example.

Both TFL and GLF require hydraulic modeling and flow monitoring to calibrate the model.

5. Performance Evaluation

An elaborate system of evaluating the performance of the system is not currently required due to age, condition and size of the township.

6. Rehabilitation/Replacement Program

Repair options are identified for each defect and life-cycle cost analysis is performed. Sections of pipes with multiple defects may be recommended for full replacement, if the cost of individual repairs is more than replacement. Although individual repairs are potentially less expensive than full replacement, they may only provide a marginal increase in the life expectancy of the pipe. Thus, full replacement provides a better value even though the initial capital cost is higher. The plan will also identify re-occurring monitoring and inspections.

1.1.5 *Water and Sewage Treatment Plants*

InfraGuide, Innovations and Best Practices – An Integrated Approach to Assessment and Evaluation of Municipal Road, Sewer and Water Networks, (November 2003) as well as the Canadian Infrastructure Report Card, Volume 1 (2012) – Municipal Roads and Water Systems has been used to develop the plan for the water and sewage treatment plants, including pumping/booster stations as well as water towers. The primary objective of a renewal plan (rehabilitation and replacement) for treatment plants is to minimize their life-cycle costs.

A comprehensive renewal plan includes:

- Systematic approach to inventory and assessing the infrastructure,
- Identifiable level of service,
- Cost calculations to renew the infrastructure,
- Risk and mitigation measures, and
- Financial plan.

The following goals of the plan are:

- Protect public: health and safety,
- Meet or exceed all applicable regulations,
- Minimize life cycle costs,
- Minimize risks,
- Ensure revenues are efficiently spent to sustain the infrastructure, and
- Identify backlog of needs.

The top-down approach has been selected based on the available information on the water and sewage treatment plants infrastructure. This approach projects the renewal costs for a given class of infrastructure and assumed life-expectancy, while being consistent with the accrual accounting method currently in place. As the system ages, further studies on the system are recommended in which more detailed inventories and analysis will be made on each aspect of the treatment systems. This will assign condition numbers and deterioration rates for each asset. This approach is called bottom-up, and typically takes several years to develop. As the information is collected for the bottom-up approach, the top-down approach can be updated and refined until the bottom-up approach is fully implemented.

The top-down approach is developed through:

1. Inventory System
   - Number of water treatment plants, type and age,
   - Number of sewage treatment plants, type and age,
   - Number of pumping/booster stations, and age, and
   - Number of water towers, material type and age.

2. Benchmark Costing
   Benchmark costs are developed for each asset.

3. Condition
   For the top-down approach, age is primarily used to assess condition. Note that age is not always the best way to assess the condition of infrastructure. Over time, more detailed information should be collected on the various components, including their performance and their efficiency, as well as their scheduled maintenance and replacement. Benchmark costs are developed for each asset.

4. Select Renewal Option
   Since water and sewage treatment plants are composed of various individual components, renewal options will vary and may consist of repairs, rehabilitation or renewal.

5. Life-cycle Analysis
   For the top-down approach the remaining life of the asset is the life expectancy less the age. Life expectancy is based on industry standards for materials and environmental conditions.

6. Capital Costs
   The capital costs are estimated for each asset requiring renewal within the next 10 years.

1.2 BENCHMARK COSTING

The estimated cost for identified improvements is calculated on an approximate basis, using average unit prices for roads, water distribution and sanitary sewers. For bridges and structural culverts, and water and sewage treatment plants, rough order magnitude cost estimates are prepared for each asset. Prices are in 2013 dollars and adjustments should be made for inflation each budget year. HST is extra.

1.2.1 *Road Network*

TABLE 3 – UNIT PRICES

ITEM	UNIT	UNIT PRICE
Earth Excavation, Grading	cu.m	$ 12.00
Earth Excavation, Ditching	m	$ 18.00
Road Widening per Shoulder	m	$ 32.00
Removal – Pulverize	sq.m	$ 1.25
Removal – Asphalt	sq.m	$ 5.00
Removal – Mill Wear Course	sq.m	$ 5.00
Removal – Concrete Curb	m	$ 7.00
Removal – Concrete Sidewalk	sq.m	$ 20.00
Remove and Replace 16m x 600mm Diameter CSP	each	$ 6,000.00
G.A.	tonne	$ 15.00
G.B.	tonne	$ 14.00
Single Surface Treatment (SST)	sq.m	$ 3.50
Double Surface Treatment (DST)	sq.m	$ 7.00
Asphalt – Wear Course	tonne	$ 140.00
Asphalt – Base Course	tonne	$ 140.00
Rout & Seal	m	$ 2.50
Rejuvenating Oil	sq.m	$ 1.50
Microfil	m	$ 10.00
Micro-Surfacing	m	$ 5.00
Ultrathin Resurfacing (scratch coat & surface coat)	m	$ 6.50
Thin Overlays	sq.m	$ 11.00
Dense Graded Cold Mix	sq.m	$ 13.00
RAP Cold Mix	sq.m	$ 7.00
Tack Coat	sq.m	$ 1.25
Iron Adjustment	each	$ 600.00
Concrete Sidewalk	sq.m	$ 100.00
Concrete Barrier Curb	m	$ 90.00
Topsoil & Sod	sq.m	$ 17.50
Topsoil & Seed	sq.m	$ 6.00

Typical types of reconstruction for hard surfaced roads (resurfacing, partial reconstruction and full depth reconstruction) are presented in Tables 4 to 7 on the following pages. Full depth reconstruction includes an allowance for geotechnical investigation and testing and for engineering design and construction supervision. In some instances, the Township may also use a professional engineer for resurfacing and/or partial reconstruction due to the complexity of the project and/or workload.

TABLE 4 – LOW COST BITUMINOUS (LCB) - RURAL ROADS(R)

CODE	DESCRIPTION	UNIT PRICE ($ per km)
LCB-R1	**Resurfacing** Single surface treatment 6.0m wide	$23,000
LCB-R2	**Partial Depth Reconstruction** Pulverize or scarify, 50-150mm G.A., double surface treatment, 10% spot drainage improvements, culvert replacement & 10% contingency	$126,000
LCB-R3	**Full Depth Reconstruction** Earth exc., 150mm G.A., 300mm G.B., DST, culvert replacement, engineering, geotechnical and 10% contingency	$448,000

TABLE 5 – HIGH COST BITUMINOUS (HCB) - RURAL ROADS (R)

CODE	DESCRIPTION	UNIT PRICE ($ per km)
HCB-R1	**Resurfacing** 40mm lift of HL3 asphalt by 6.0m and 10% contingency	$95,000
HCB-R2	**Partial Depth Reconstruction** Pulverize, 50-150mm G.A., 50mm lift of HL4 asp, shouldering, 10% spot drainage improvements, culvert replacement & 10% contingency	$193,000
HCB-R3	**Full Depth Reconstruction** Remove asphalt, earth exc., 150mm G.A., 300mm G.B., 50mm Lift of HL4 asphalt, shouldering, culvert replacement, engineering, geotechnical and 10% contingency	$569,000
HCB-R4	**Rout and Seal** Routing of cracks	$4,000
HCB-R6	**Rejuvenating Oil** Oil that penetrates an asphalt surface and restores the Maltene to asphalt ratio.	$10,000

TABLE 6 – HIGH COST BITUMINOUS (HCB) - SEMI-URBAN ROADS (S)

CODE	DESCRIPTION	UNIT PRICE ($ per km)
HCB-S1	**Resurfacing** 40mm lift of HL3 asphalt by 8.0m wide, adjust iron, asphalt keys, tie-in driveways and 10% contingency	$124,000
HCB-S2	**Partial Depth Reconstruction** Remove asphalt, earth exc., 150mm G.A., 50mm lift of HL4 asphalt, shouldering, adjust iron, tie-in driveways, road culvert replacement, 10% spot drainage and 10% contingency	$267,000
HCB-S3	**Full Depth Reconstruction** Remove asphalt, earth exc., 150mm G.A., 300mm G.B., 50mm HL4 asp, shouldering, adjust iron, tie-in driveways, road & driveway culvert replacement, drainage, engineering, geotechnical & 10% contingency	$880,000
HCB-S4	**Rout and Seal** Routing of cracks	$4,000
HCB-S6	**Rejuvenating Oil** Oil that penetrates an asphalt surface and restores the Maltene to asphalt ratio.	$10,000

TABLE 7 – HIGH COST BITUMINOUS (HCB) - URBAN ROADS (U)

CODE	DESCRIPTION	UNIT PRICE ($ per km)
HCB-U1	**Resurfacing** 40mm Lift of HL3 asphalt by 8.5m wide, adjust iron, milling and 10% contingency	$197,000
HCB-U2	**Partial Depth Reconstruction** Remove asphalt, 10% curb and sidewalk repairs, earth exc., 150mm G.A., 40mm lift of HL3 and 40mm lift of HL4 asphalt, adjust iron and 10% contingency	$441,000
HCB-U3	**Full Depth Reconstruction** Remove asphalt, curbs and sidewalk, earth exc., 150mm G.A., 300mm G.B., 2 lifts of asphalt, adjust iron, curbs, sidewalk, tie-in driveways and lawns, geotechnical, engineering and 10% contingency	$1,231,000
HCB-U4	**Rout and Seal** Routing of cracks	$10,000
HCB-U6	**Rejuvenating Oil** Oil that penetrates an asphalt surface and restores the Maltene to asphalt ratio.	$43,000

1.2.2 *Water Distribution System*

TABLE 8 – UNIT PRICES

ITEM	UNIT	UNIT PRICE
Watermains		
100mm	m	$ 200.00
150mm	m	$ 275.00
200mm	m	$ 350.00
250mm	m	$ 425.00
300mm	m	$ 500.00
400mm	m	$ 575.00
Hydrants	Ea.	$ 7,500.00
Valves	Ea.	$ 4,000.00

1.2.3 *Sanitary Sewer Collection System*

TABLE 9 – UNIT PRICES

ITEM	UNIT	UNIT PRICE
Sanitary Pipe (PVC)		
200mm	m	$ 300.00
250mm	m	$ 350.00
300mm	m	$ 400.00
375mm	m	$ 450.00
450mm	m	$ 500.00
525mm	m	$ 525.00
600mm	m	$ 550.00
Sanitary Pipe (CONC)		
300mm	m	$ 325.00
375mm	m	$ 375.00
450mm	m	$ 425.00
525mm	m	$ 475.00
600mm	m	$ 525.00
Round Maintenance Hole		
1200mm	Ea.	$ 4,925.00
1500mm	Ea.	$ 8,450.00
1800mm	Ea.	$ 11,675.00
Box Maintenance Hole		
1200mmx1200mm	Ea.	$ 4,500.00
1520mmx1830mm	Ea.	$ 7,500.00

Typical types of trenchless spot repairs (reaming, chemical grouting, lining) for sanitary sewers of various sizes are included in Table 10. Prices are in 2013 dollars and adjustments should be made for inflation each budget year. HST is extra.

TABLE 10 – TRENCHLESS SPOT REPAIR UNIT PRICES

ITEM	UNIT	UNIT PRICE
Pre-CCTV & Cleaning of Main Lines Including Root Removal	m	$ 10.00
Reaming of Mineral Deposits in Mainlines	m	$ 45.00
Cutting of Protruding Taps	Ea.	$ 450.00
Testing of 200mm Pipe	Ea.	$ 129.00
Chemical Grouting of 200mm Pipe	Ea.	$ 380.00
Testing of 250mm Pipe	Ea.	$ 120.00
Chemical Grouting of 250mm Pipe	Ea.	$ 400.00
Testing of 375mm Pipe	Ea.	$ 120.00
Chemical Grouting of 375mm Pipe	Ea.	$ 440.00
Testing of 450mm Pipe	Ea.	$ 120.00
Chemical Grouting of 450mm Pipe	Ea.	$ 480.00
Testing of 525mm Pipe	Ea.	$ 150.00
Chemical Grouting of 525mm Pipe	Ea.	$ 550.00
Chemical Grout	L	$ 90.00
Cleaning of Lateral Connections Connected to Mainline	Ea.	$ 650.00
Post Lateral Connection Residual Grout Cleaning	Ea.	$ 300.00
Cured in Place Pipe Liner (CIPP)	m	$ 795.00
Clearing of Lateral Connections after CIPP Lining	Ea.	$ 600.00
Bypass Pumping	Ea.	$ 8,000.00
Warranty CCTV Inspection of Mainlines	m	$ 12.00

2.0 DESIRED LEVEL OF SERVICE

This section identifies targets in order to achieve the desired level of service, and also identifies which targets are not currently being met.

2.1 ROADS AND BRIDGES

The desired levels of service for maintenance are based on Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways. The Regulations classifies roads from 1 to 6 based on the volume of traffic and the posted or statutory speed limit. The standards outline the minimum maintenance standards for the following activities:

1. Patrolling,
2. Plowing, salting, and/or applying abrasive materials to the roadway for snow accumulation,
3. Salting and/or applying abrasive materials to icy roads and ice formation prevention,
4. Pothole repairs,
5. Shoulder drop repairs,
6. Crack repairs,
7. Debris removal,
8. Maintaining illumination,
9. Maintaining traffic control signals,
10. Repairing bridge spalls,
11. Sign replacement and repairs, and
12. Road and sidewalk surface discontinuities.

The desired level of service for maintaining the road system is based on the optimum life cycle of the road structure, i.e. the reconstruction strategy presented in Table 31, Section 4.3. Over the life cycle for the surface type the average condition rating for each surface type is as follows:

Surface Type	Average Condition Rating
Gravel	6.00
Surface Treatment	6.45
Asphalt	7.17 – 7.52

The measure for the desired level of service for the road system will be based on the optimum average condition rating by surface type, which can be measured against the existing inventory of the road system. Section 5.0 discusses the current gap in infrastructure spending and strategies on how to address the spending shortfall.

The desired level of service for bridges and structural culverts is for at least seventy percent (70%) of structures to have a condition rating of at least “Good” to “Very Good”, in which 70% is the 2012 Ontario Municipal Benchmarking Initiative (OMBI) Statistics median.

2.2 WATER AND WASTEWATER

The desired level of service for municipal water and wastewater is an amalgam of regulatory compliance (e.g. Safe Drinking Water Act, conditions of environmental permits and approvals, workplace safety), fiscal sustainability and customer satisfaction. There can also be overlap of criteria such as capacity, quantity and quality.

Compliance with regulatory requirements is a major influence on the level of service provided – compliance will most likely achieve customer satisfaction with the performance of these facilities. There is also the consideration that charges for a failure to comply do not negate the requirement to comply. Fiscal sustainability can be a positive and negative consideration depending on whether the treatment facilities and associated infrastructure have been historically maintained.

In terms of water, the Township must take into account the requirements of the Safe Drinking Water Act and its associated regulations and standards, including but not limited to:

- Ontario Regulation 170 - Drinking Water Systems
- the Drinking Water Quality Standards
- the Municipal Drinking Water Licensing Program
    - A Drinking Water Works Permit (DWWP)
    - A Permit to Take Water (PTTW)
- the Drinking Water Quality Management Standard (DWQMS)
- the Financial Plans Regulation

Similarly, for wastewater, the following legislation could apply:

- Ontario Water Resources Act (OWRA)
    - Environmental Compliance Approval (ECA) and/or Certificate of Approval (C of A) and associated terms and conditions
- Environmental Protection Act (EPA)
- Wastewater Systems Effluent Regulations (WSER) under the federal Fisheries Act

The end user desired level of service for the water and wastewater is therefore to meet the requirements within the Drinking Water License, Environmental Compliance Approval and the aforementioned regulations.

The reliability of the system is also important to the public and the fire department and therefore the number of disruptions through watermain breaks is a measure of the reliability of the system. The desired level of service for reliability for watermains is to keep the number of breaks per year per 100 kilometers in the watermain (excluding service connections and hydrant leeds) below the Ontario median of 8.6, which is per 2012 Ontario Municipal Benchmarking Initiative (OMBI) Statistics.

The reliability of the sanitary sewer system is based on minimizing backups. Therefore the end user desired level of service is for the annual number of wastewater main backups per 100 kilometers of wastewater main to be below the Ontario median of 0.47, which is per 2012 Ontario Municipal Benchmarking Initiative (OMBI) Statistics.

3.0 STATE OF LOCAL INFRASTRUCTURE

This section summarizes (1) the asset types; (2) financial accounting valuation and replacement cost valuation; (3) asset age distribution in proportion of useful life; and (4) asset condition. The financial accounting evaluation uses Net Book Value which is the original price of the asset, less depreciation.

3.1 ROAD NETWORK

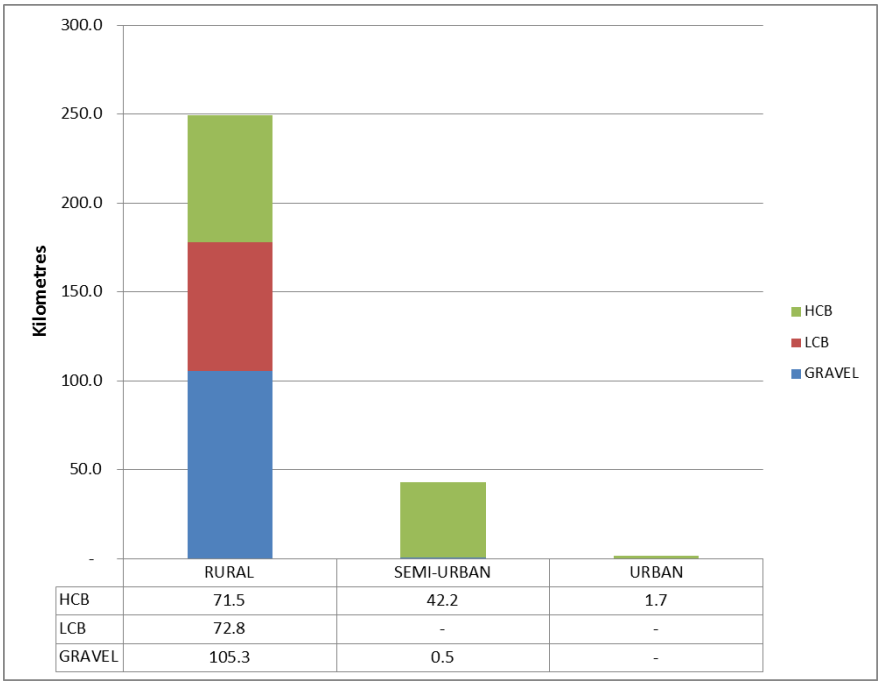
3.1.1 *Asset Types*

Map 1 presents the roads by surface type in which there is an approximately a 60/40 split between hard surface and gravel roads. See Table 11 for the lengths for Gravel Roads (Year Round), Low Class Bituminous (LCB or surface treatment) and High Class Bituminous (HCB or asphalt). Earth roads (totalling 8.1km) are excluded from the rating of the roads. Figure 2 presents the length of surface type in each environment.

TABLE 11 - ROAD LENGTHS

SURFACE TYPE	LENGTH (KM)	LENGTH (%)
GRAVEL	105.8	36%
LCB	72.8	25%
HCB	115.3	39%
TOTAL	**293.9**	**100%**

FIGURE 2 – ROAD NETWORK BY ENVIRONMENT AND SURFACE TYPE



	RURAL	SEMI-URBAN	URBAN
HCB	71.5	42.2	1.7
LCB	72.8	-	-
GRAVEL	105.3	0.5	-

3.1.2 *Financial Accounting and Replacement Cost Valuation*

The replacement value of the road infrastructure is $155 million, which is in 2013 dollars and meets current standards. For example, a rural road with a current platform width of 6.0m would now be constructed to current standards of 8.0m. Table 12 presents the replacement value by asset type and environment. Appendix A shows the inventory for each road segment including the replacement value. The net book value of the road assets is $11.8 million and is presented in Appendix B.

TABLE 12 - ASSET REPLACEMENT COST VALUATION ($1,000,000s)

SURFACE TYPE	RURAL	SEMI-URBAN	URBAN	TOTAL
GRAVEL	$ 41.1	$ 0.2	$ -	$ 41.3
LCB	$ 32.6	$ -	$ -	$ 32.6
HCB	$ 42.6	$ 37.1	$ 2.0	$ 81.7
TOTAL	$ 116.3	$ 37.3	$ 2.0	$ 155.6

3.1.3 *Asset Age and Remaining Life*

The age distribution for gravel, surface treatment (LCB) and asphalt (HCB) roads is presented in Figures 3 to 5. The average remaining life of each asset type is presented in Table 13.

FIGURE 3 - AGE DISTRIBUTION - GRAVEL ROADS

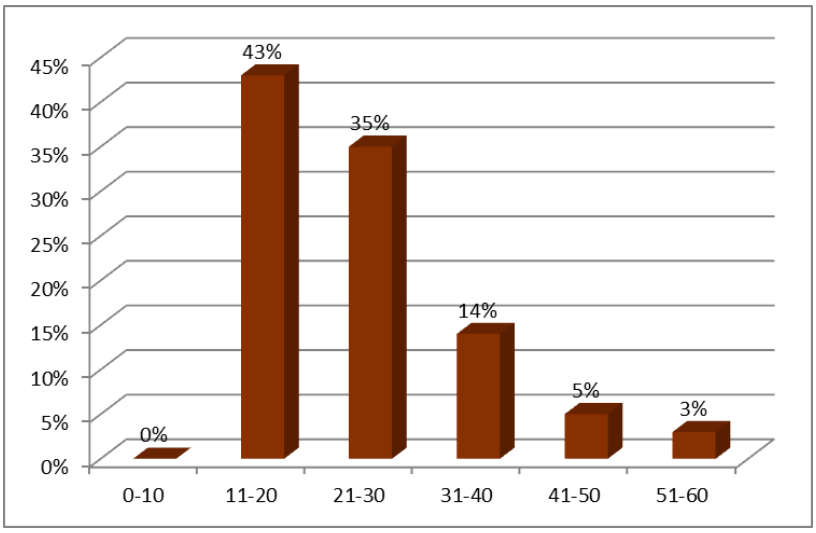


FIGURE 4 - AGE DISTRIBUTION - SURFACE TREATED ROADS (LCB)

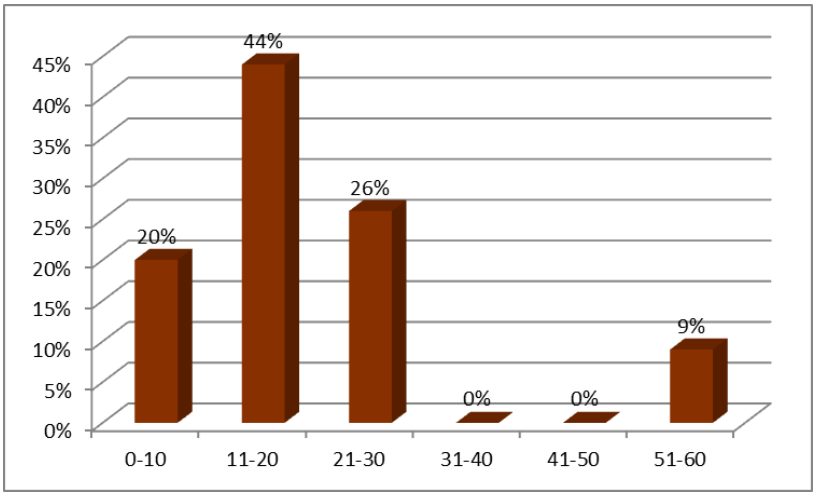


FIGURE 5 - AGE DISTRIBUTION - ASPHALT ROADS (HCB)

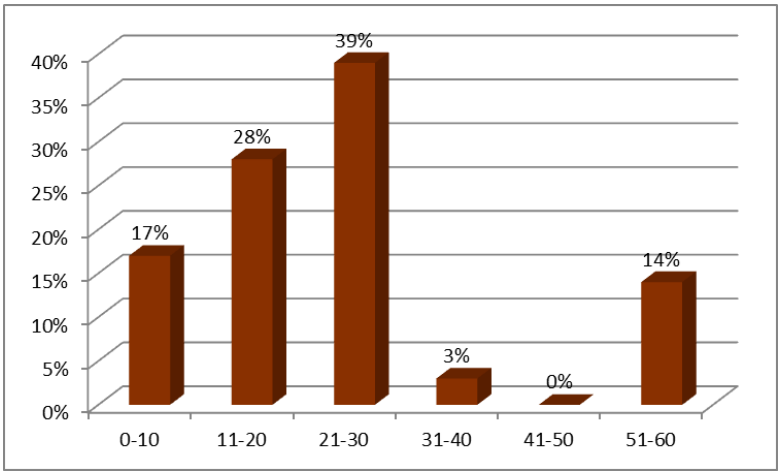


TABLE 13 - AVERAGE REMAINING LIFE BY ROAD TYPE (YEARS)

GRAVEL	SURFACE TREATMENT	ASPHALT
36	15	16

3.1.4 *Asset Condition Rating*

The condition of each road has been categorized as “Very Poor”, “Poor”, “Fair”, “Good” and “Excellent” based on the condition rating assigned for the road segment. See Table 14 for the rating system.

TABLE 14 – CONDTION RATING

VERY POOR	POOR	FAIR	GOOD	EXCELLENT
1 - 2	3 - 4	5 - 6	7 - 8	9 - 10

Figures 6, 7 and 8 present the condition of each road type. The overall average structural condition of South Stormont’s road system is Fair, based on an overall rating of 5.71. Map 2 shows the now deficient roads, i.e. roads with a condition rating of less than 5.0 in 2013.

FIGURE 6 - CONDITION RATING DISTRIBUTION - GRAVEL ROAD

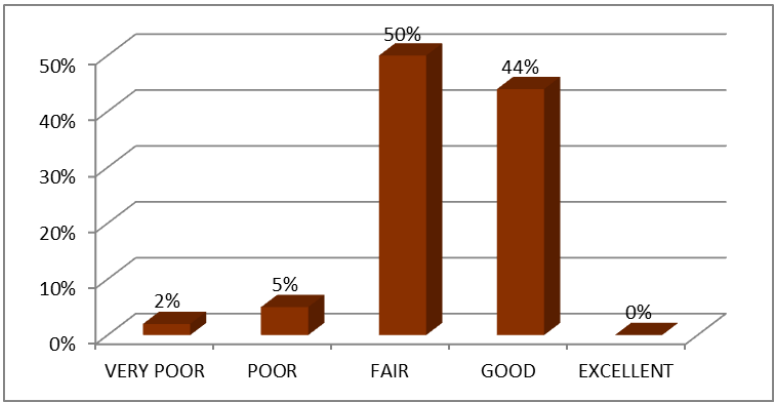


FIGURE 7 - CONDITION RATING DISTRIBUTION - SURFACE TREATED ROADS (LCB)

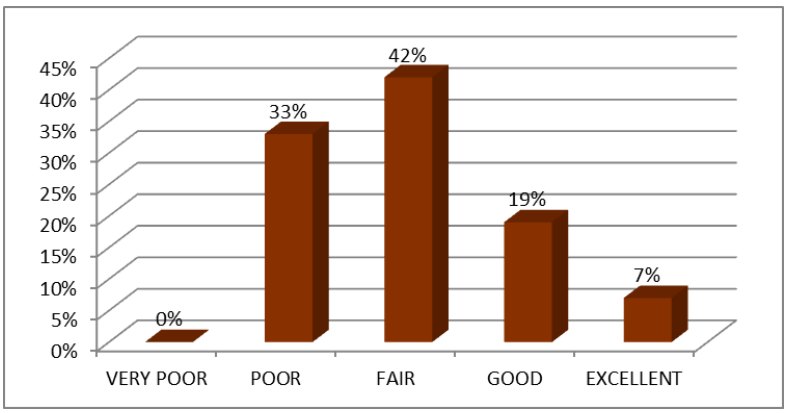
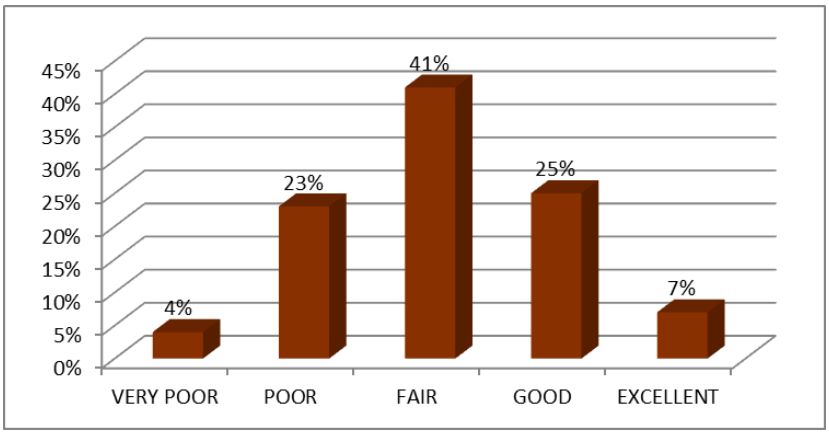


FIGURE 8 - CONDITION RATING DISTRIBUTION - ASPHALT ROADS (HCB)



3.2 BRIDGES AND STRUCTURAL CULVERTS

3.2.1 *Asset Types*

The Township has nine bridges and 19 structural culverts. Table 15 presents a detailed listing of the asset types.

TABLE 15 - ASSET TYPES

ASSET ID	ROAD NAME	TYPE
BRIDGES		
31-170	North Lunenburg Road West	Precast concrete rigid frame bridge
31-175	Valade Road	Box beam bridge
31-181	Lefave Road	Box beam bridge
31-182	Delaney Road	Steel I beam bridge
31-186	Delaney Road	Earth filled pre-cast concrete arch bridge
31-187	McPhail Road	Solid slab bridge
31-208	Barlow Road	Steel I beam bridge
31-303	Shaver Road	Half-Through Deck Truss bridge
31-A21	Morgan Road	Precast concrete rigid frame bridge
STRUCTURAL CULVERTS		
C31-167	North Lunenburg Road West	Steel plate corrugate steel pipe (SPCSP)
C31-169	North Lunenburg Road West	Steel plate corrugate steel pipe (SPCSPA)
C31-A01	Goldfield Road	Steel plate corrugate steel pipe arch (SPCSPA)
C31-A02	Hunter Road	Steel plate corrugate steel pipe arch (SPCSPA)
C31-A03	Otto Road	Corrugated steel pipe arch (CSPA)
C31-A04	Hart Road	Corrugated steel pipe arch (CSPA)
C31-A05	Bruining Road	Concrete rectangular culvert
C31-A06	Beckstead Road	Corrugated steel pipe arch (CSPA)
C31-A07	Pleasant Valley Road	Steel plate corrugate steel pipe arch (SPCSPA)
C31-A08	Anderson Road	Open footing concrete rectangular culvert
C31-A10	Finch-Osnabruck Boundary Road	Steel plate corrugate steel pipe (SPCSP)
C31-A12	Cooper Road	Concrete box culvert
C31-A13	Wilburn Road	Corrugated steel pipe arch (CSPA)
C31-A15	MacRae Road	Corrugated steel pipe (CSP)
C31-A16	Northfield Road	Steel plate corrugate steel pipe arch (SPCSPA)
C31-A17	Myers Road	Open footing concrete rectangular culvert
C31-A18	O'Keefe Road	Corrugated steel pipe (CSP)
C31-A19	Willy Bill Road	Steel pipe corrugate steel pipe (SPCSP)
C31-A20	Island Road	Open footing box culvert

3.2.2 *Financial Accounting and Replacement Cost Valuation*

The replacement value of the structures in 2013 dollars is $10.51 million and is presented in Table 16. The net book value, which is the original price of the asset less depreciation, is $3.92 million as presented in Appendix B.

TABLE 16 - ASSET REPLACEMENT COST

ASSET ID	ROAD NAME	REPLACEMENT COST
BRIDGES		
31-170	North Lunenburg Road West	$ 730,000.00
31-175	Valade Road	$ 1,280,000.00
31-181	Lefave Road	$ 920,000.00
31-182	Delaney Road	$ 1,070,000.00
31-186	Delaney Road	$ 600,000.00
31-187	McPhail Road	$ 690,000.00
31-208	Barlow Road	$ 510,000.00
31-303	Shaver Road	$ 670,000.00
31-A21	Morgan Road	$ 680,000.00
SUB-TOTAL (BRIDGES)		**$ 7,150,000.00**
STRUCTURAL CULVERTS		
C31-167	North Lunenburg Road West	$ 150,000.00
C31-169	North Lunenburg Road West	$ 170,000.00
C31-A01	Goldfield Road	$ 160,000.00
C31-A02	Hunter Road	$ 170,000.00
C31-A03	Otto Road	$ 180,000.00
C31-A04	Hart Road	$ 130,000.00
C31-A05	Bruining Road	$ 360,000.00
C31-A06	Beckstead Road	$ 140,000.00
C31-A07	Pleasant Valley Road	$ 150,000.00
C31-A08	Anderson Road	$ 230,000.00
C31-A10	Finch-Osnabruck Boundary Road	$ 140,000.00
C31-A12	Cooper Road	$ 310,000.00
C31-A13	Wilburn Road	$ 130,000.00
C31-A15	MacRae Road	$ 140,000.00
C31-A16	Northfield Road	$ 150,000.00
C31-A17	Myers Road	$ 280,000.00
C31-A18	O'Keefe Road	$ 130,000.00
C31-A19	Willy Bill Road	$ 120,000.00
C31-A20	Island Road	$ 120,000.00
SUB-TOTAL (CULVERTS)		**$ 3,360,000.00**
TOTAL (BRIDGES + CULVERTS)		**$ 10,510,000.00**

3.2.3 *Asset Age and Remaining Life*

The age and the remaining life of the structural assets are presented in Figures 9 to 12 and Table 17. The Bridge Code requires that all new structures have a design life of 75 years. Structures designed prior to this requirement, typically culverts, may have a reduced estimated life. Significant spending has been done to replace the aging bridge infrastructure, which is reflected in the average bridge age of 24 years. The structural culverts are slightly older with an average age of 29 years. Over the next 30 years, a significant number of culverts will be coming up for renewal as can be seen in the tables below.

FIGURE 9 – AGE DISTRIBUTION – BRIDGES

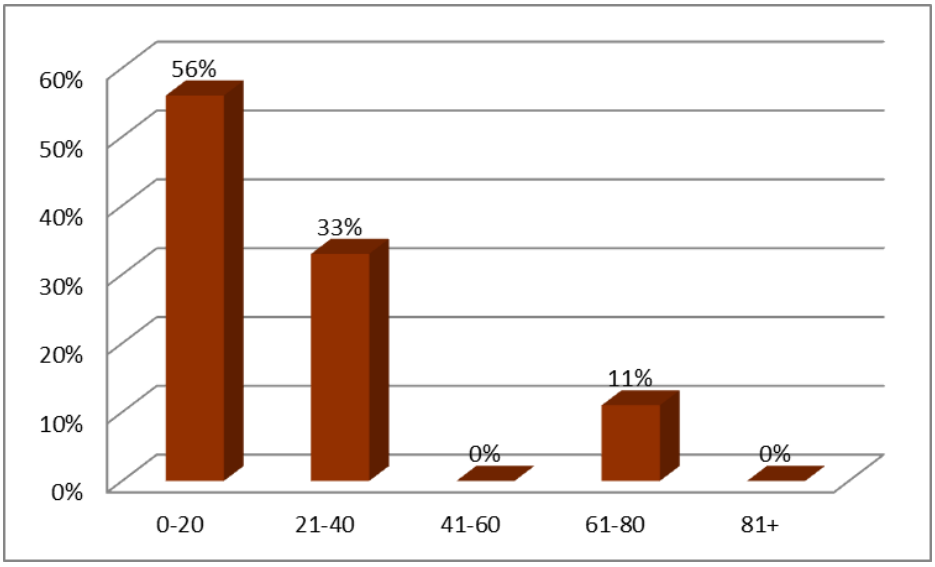


FIGURE 10 – AGE DISTRIBUTION – STRUCTURAL CULVERTS

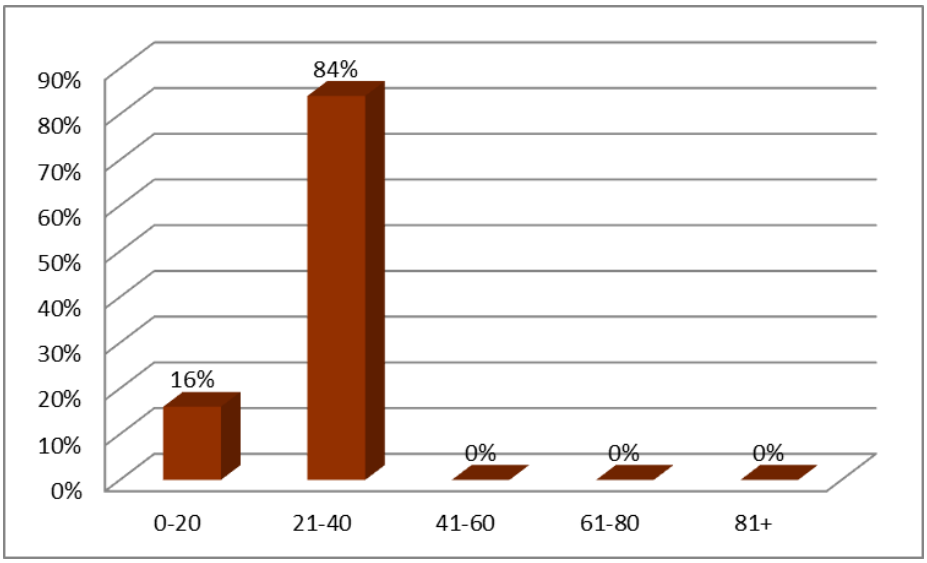


FIGURE 11 – REMAINING LIFE DISTRIBUTION – BRIDGES

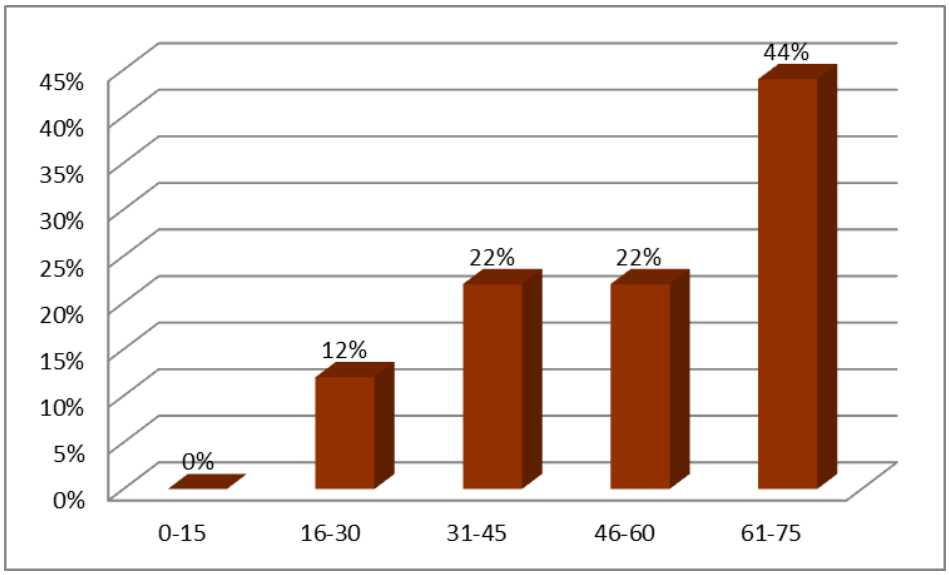


FIGURE 12 – REMAINING LIFE DISTRIBUTION – STRUCTURAL CULVERTS

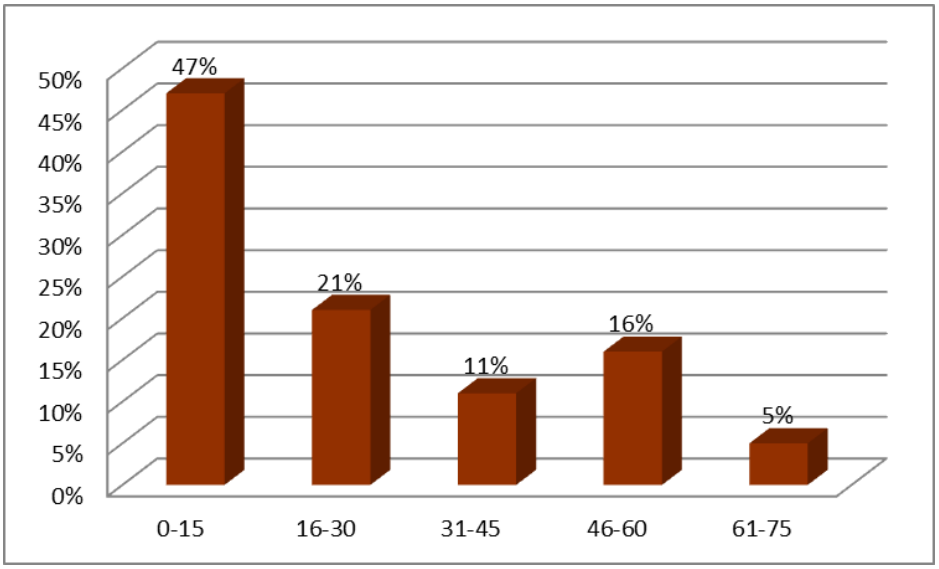


TABLE 17 – ASSET AGE AND REMAINING LIFE

ASSET ID	ROAD NAME	IN SERVICE YEAR	AGE	ESTIMATED LIFE	REMAINING LIFE
BRIDGES					
31-170	North Lunenburg Road West	2008	5	75	70
31-175	Valade Road	1978	35	75	40
31-181	Lefave Road	1978	35	75	40
31-182	Delaney Road	2009	4	75	71
31-186	Delaney Road	2006	7	75	68
31-187	McPhail Road	1988	25	75	50
31-208	Barlow Road	1995	18	75	57
31-303	Shaver Road	1936	77	96	19
31-A21	Morgan Road	2007	6	75	69
AVERAGE			**24**		**54**
STRUCTURAL CULVERTS					
C31-167	North Lunenburg Road West	1978	35	41	6
C31-169	North Lunenburg Road West	1974	39	45	6
C31-A01	Goldfield Road	1975	38	50	12
C31-A02	Hunter Road	1976	37	43	6
C31-A03	Otto Road	2013	0	75	75
C31-A04	Hart Road	1980	33	50	17
C31-A05	Bruining Road	1992	21	75	54
C31-A06	Beckstead Road	1978	35	50	15
C31-A07	Pleasant Valley Road	1978	35	50	15
C31-A08	Anderson Road	1983	30	75	45
C31-A10	Finch-Osnabruck Boundary Road	1975	38	50	12
C31-A12	Cooper Road	1994	19	75	56
C31-A13	Wilburn Road	1980	33	50	17
C31-A15	MacRae Road	1980	33	50	17
C31-A16	Northfield Road	1977	36	50	14
C31-A17	Myers Road	1976	37	75	38
C31-A18	O'Keefe Road	1988	25	50	25
C31-A19	Willy Bill Road	1976	37	50	13
C31-A20	Island Road	2009	4	50	46
AVERAGE			**29**		**26**

3.2.4 *Asset Condition Rating*

Each element (e.g. girders, abutment walls, steel beam guide rail, etc.) of the structure is assigned a condition rating of "Very Poor", "Poor", "Fair", "Fair to Good", "Good" and "Excellent". An overall rating of the structure is developed from the condition of the individual elements. One major element, however, may govern the overall rating of the structure. For example, a bridge may have most of its elements rated as fair, however the girders have been rated as poor. Since the girders are integral to the bridge`s structural capability to safely convey traffic, the "Poor" rating assigned to the girders would be applied in this case to the bridge rating.

Figures 13 and 14 present the condition of the bridges and structural culverts, respectively. Table 18 presents the condition rating for each structure. The overall average structural condition of South Stormont's bridges is "Good", and the overall condition rating of the structural culverts is also "Good".

FIGURE 13 – ASSET CONDITION DISTRIBUTION – BRIDGES

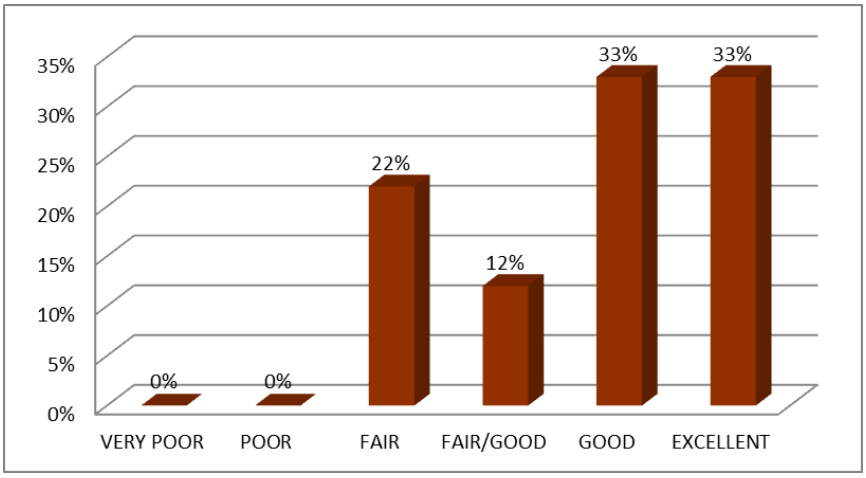


FIGURE 14 – ASSET CONDITION DISTRIBUTION – STRUCTURAL CULVERTS

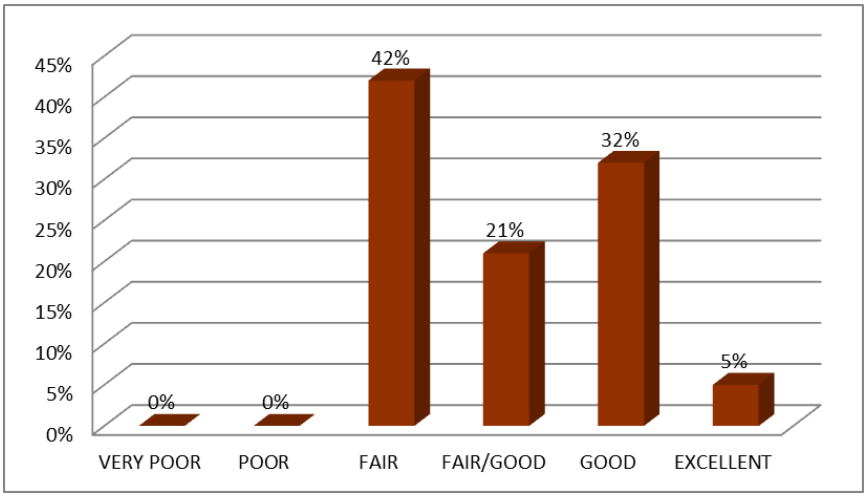


TABLE 18 – ASSET CONDITION

ASSET ID	ROAD NAME	CONDITION
BRIDGES		
31-170	North Lunenburg Road West	EXCELLENT
31-175	Valade Road	FAIR
31-181	Lefave Road	FAIR
31-182	Delaney Road	EXCELLENT
31-186	Delaney Road	EXCELLENT
31-187	McPhail Road	GOOD
31-208	Barlow Road	GOOD
31-303	Shaver Road	FAIR/GOOD
31-A21	Morgan Road	GOOD
OVERALL AVERAGE RATING		**GOOD**
STRUCTURAL CULVERTS		
C31-167	North Lunenburg Road West	FAIR
C31-169	North Lunenburg Road West	FAIR
C31-A01	Goldfield Road	FAIR
C31-A02	Hunter Road	FAIR
C31-A03	Otto Road	EXCELLENT
C31-A04	Hart Road	FAIR/GOOD
C31-A05	Bruining Road	GOOD
C31-A06	Beckstead Road	FAIR
C31-A07	Pleasant Valley Road	GOOD
C31-A08	Anderson Road	FAIR
C31-A10	Finch-Osnabruck Boundary Road	FAIR
C31-A12	Cooper Road	GOOD
C31-A13	Wilburn Road	GOOD
C31-A15	MacRae Road	FAIR/GOOD
C31-A16	Northfield Road	FAIR/GOOD
C31-A17	Myers Road	GOOD
C31-A18	O'Keefe Road	FAIR/GOOD
C31-A19	Willy Bill Road	GOOD
C31-A20	Island Road	EXCELLENT
OVERALL AVERAGE RATING		**GOOD**

3.3 WATER DISTRIBUTION SYSTEM

3.3.1 *Asset Types*

The lengths and size distribution of watermains, as well as the quantity of valves and hydrants that make up the water distribution system for the Township, are presented in Table 19. Maps 4A and 4B present the size and material for each segment of the water distribution system.

TABLE 19 - WATER DISTRIBUTION SYSTEM INVENTORY

Asset Type	Quantity	% of Total
100mm Watermain	3106.44 m	4%
150mm Watermain	32715.22 m	44%
200mm Watermain	16409.26 m	22%
250mm Watermain	4232.84 m	6%
300mm Watermain	5023.2 m	7%
400mm Watermain	13657.26 m	18%
Watermains (Total)	75144.22 m	100%
Hydrants	370 ea.	-
Valves	419 ea.	-

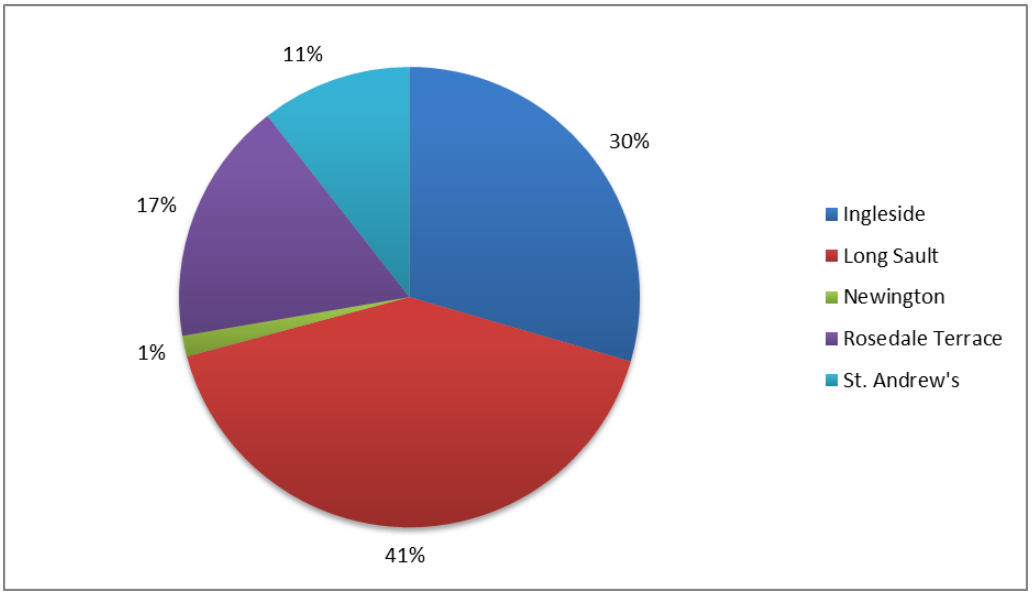
3.3.2 *Financial Accounting and Replacement Cost Valuation*

The total replacement value of the water distribution system is $31.5 million in 2013 dollars, as presented in Table 20. Figure 15 shows the distribution of asset valuation over the different areas of the Township. The net book value of the water distribution assets is $10.67 million, and is presented in Appendix B.

TABLE 20 - REPLACEMENT COST VALUATION ($1,000,000s)

Asset Type	Replacement Cost	% of Total
100mm Watermain	$ 0.6	2%
150mm Watermain	$ 9.0	33%
200mm Watermain	$ 5.7	21%
250mm Watermain	$ 1.8	7%
300mm Watermain	$ 2.5	9%
400mm Watermain	$ 7.9	29%
Watermains - Subtotal	$ 27.5	100%
Hydrants	$ 2.3	-
Valves	$ 1.7	-
Total	**$ 31.5**	**-**

FIGURE 15 - ASSET VALUATION BY AREA – WATER DISTRIBUTION SYSTEM



3.3.3 *Asset Age and Remaining Life*

The age distribution for watermains, valves and hydrants is presented in Figures 16 to 18. The average remaining life for each is presented in Table 21. Maps 4A and 4B present the age of the water distribution system for South Stormont.

FIGURE 16 - WATERMAIN AGE DISTRIBUTION

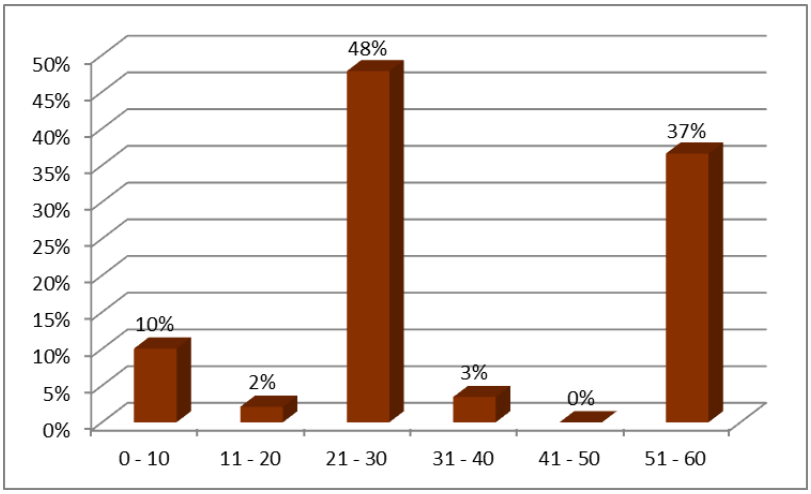


FIGURE 17 - VALVE AGE DISTRIBUTION

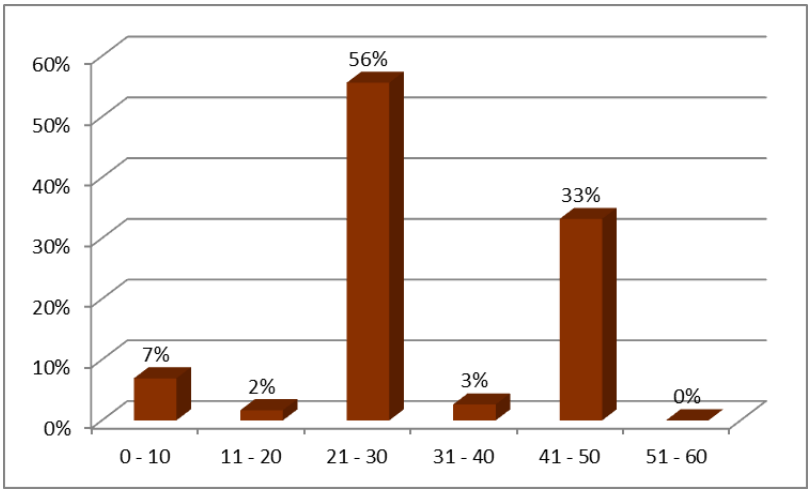


FIGURE 18 - HYDRANT AGE DISTRIBUTION

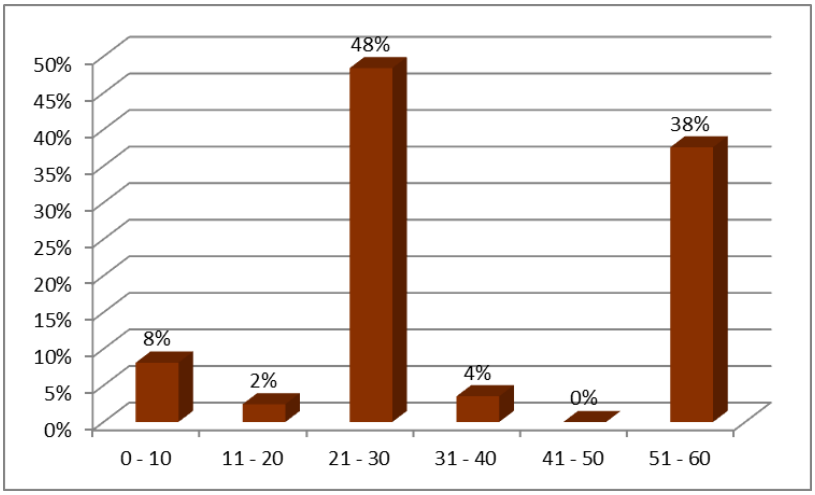


TABLE 21 - AVERAGE REMAINING LIFE BY ASSET TYPE (YEARS)

Watermains	Valves	Hydrants
54	19	41

3.3.4 *Unscheduled Repairs of Water Distribution Assets*

Table 22 below displays the unscheduled watermain repairs over the past three years. The recommended level of service is less than 8.6 breaks per 100km each year. Of note, 2011 is higher than the recommended by 3.4 breaks per 100km; however the average over the three years is 6.7 breaks per 100km each year, which is well below the recommended number. The watermains on Maple Street, which had previously been responsible for five breaks in 2010 and 2011, as well as on Pine Street were replaced in 2012. If the breaks which occurred on Maple Street are disregarded, the total for 2011 would be reduced to 9.3 breaks per 100km, which lowers the overall average over the three year period to 4.9 breaks per 100km per year.

TABLE 22 – UNSCHEDULED WATERMAIN REPAIRS PER 100KM

Area	WM Length (Km)	2010	2011	2012
Long Sault/Ingleside	53.6	5.6	16.8	5.6
Rosedale/St. Andrews	19.7	0.0	0.0	0.0
Newington	1.8	0.0	0.0	0.0
Total Average	**75.1**	**4.0**	**12.0**	**4.0**

3.4 SANITARY SEWER COLLECTION SYSTEM

3.4.1 *Asset Types*

Maps 5A and 5B present the size and material for each segment of the sanitary sewer system. Notice that unlike the water distribution system, sanitary sewers are only present in Ingleside and Long Sault. See Table 23 for the total lengths of pipe by material.

TABLE 23 - SANITARY SEWER PIPE LENGTHS

Pipe Material	Length (m)	Length (%)
PE	156.9	1%
Concrete	3,165.8	11%
Asbestos Cement	5,863.5	20%
PVC	9,973.2	34%
Vitrified Clay	10,315.1	35%
Total	**29,474.57**	**100%**

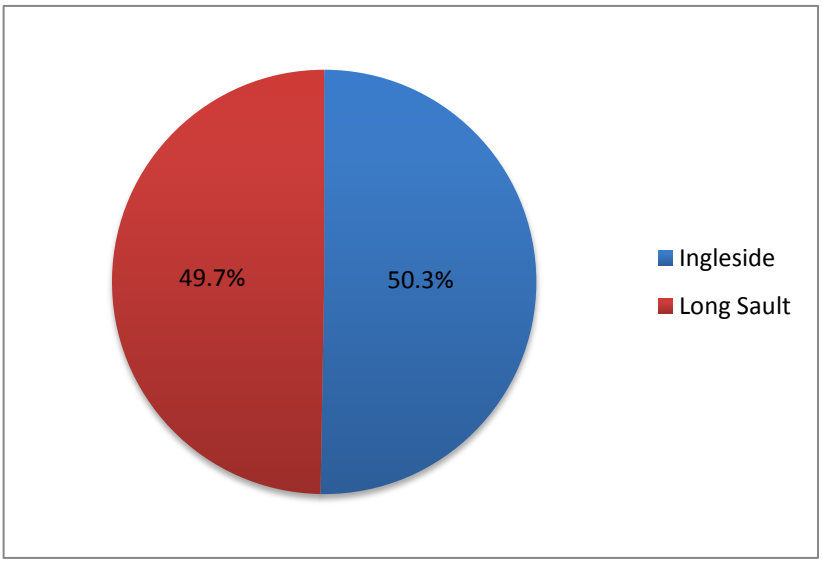
3.4.2 *Financial Accounting and Replacement Cost Valuation*

The total replacement value of the sanitary sewer collection system is $12.2 million in 2013 dollars, as presented in Table 24. Figure 19 shows the distribution of asset valuation between Ingleside and Long Sault. The net book value of the sanitary sewer system is $1.83 million, as presented in Appendix B.

TABLE 24 – SANITARY SYSTEM REPLACEMENT COST VALUATION

Asset Type	Replacement Cost	% of Total
Sanitary Pipe (PVC)		
200mm	$ 4,034,875	33.0%
250mm	$ 3,368,943	27.6%
300mm	$ 230,179	1.9%
Sanitary Pipe (Conc)		
375mm	$ 390,619	3.2%
450mm	$ 96,788	0.8%
525mm	$ 1,228,196	10.0%
600mm	$ 1,033,684	8.5%
Man Holes		
1200mm dia.	$ 1,802,550	14.7%
1800mm dia.	$ 35,025	0.3%
Total	**$ 12,220,859**	**100%**

FIGURE 19 – ASSET VALUATION BY AREA – SANITARY SEWER COLLECTION SYSTEM



3.4.3 *Asset Age and Remaining Life*

The age distribution of the sanitary sewer pipe network is presented in Figure 20. The average remaining life of each sewer type is presented in Table 25.

FIGURE 20 - SANITARY SEWER PIPE AGE DISTRIBUTION

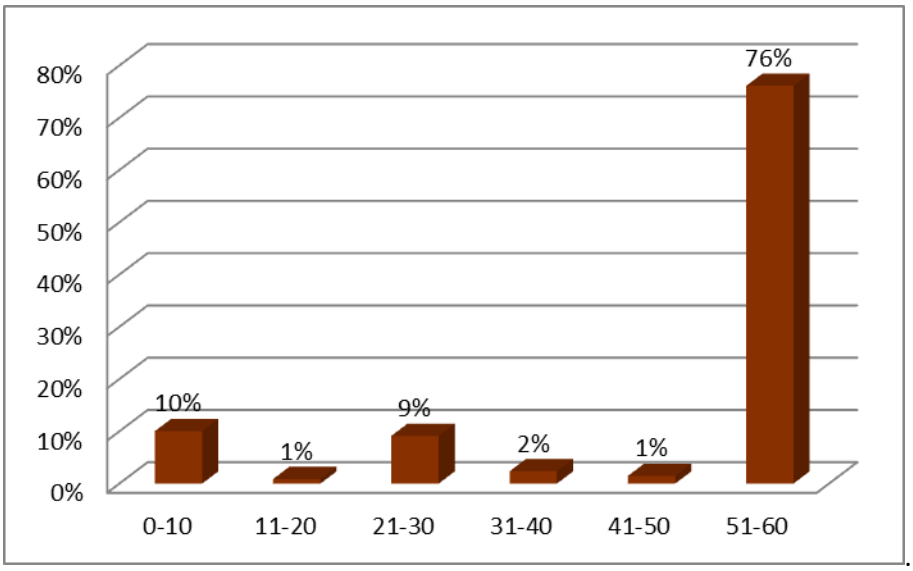


TABLE 25 - AVERAGE REMAINING LIFE BY PIPE MATERIAL (YEARS)

PE	CONCRETE	ASBESTOS CEMENT	PVC	VITRIFIED CLAY
44	52	48	65	44

3.4.4 *Asset Condition Rating*

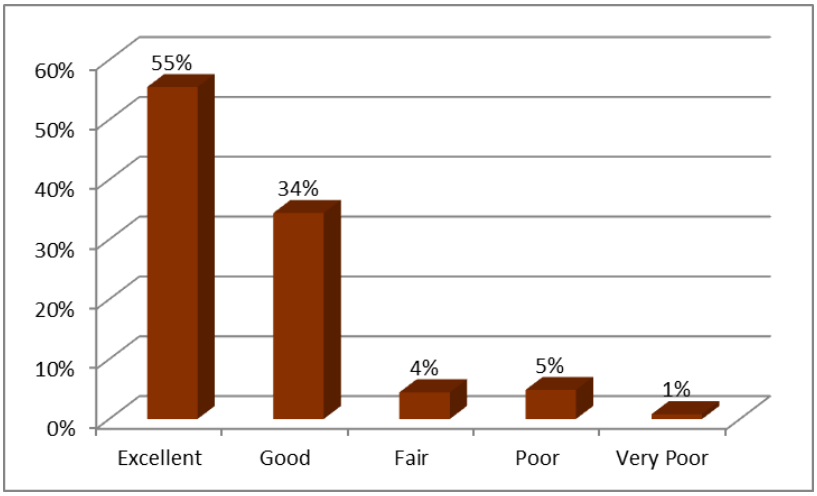
The condition of each sanitary sewer pipe length has been categorized as “Severe”, “Poor”, “Fair”, “Average” and “Good” based on the frequency and severity of structural and operational deficiencies observed in each pipe. See Table 26 for the rating system.

TABLE 26 – CONDITION RATING FOR SANITARY SEWERS

CONDITION	DESCRIPTION
EXCELLENT	Pipe is structurally sound and functioning as originally intended. Some small, operational repairs may be required.
GOOD	Pipe is structurally sound and functioning as originally intended. Some small, local improvements will be required as minor deficiencies deteriorate further.
FAIR	Pipe is functioning at a lower level than originally intended. Pipe sections showing signs of deterioration and require maintenance.
POOR	Pipe sections showing signs of significant deterioration and performing at a much lower level than originally intended. Pipe sections require substantial repairs.
VERY POOR	Pipe sections are compromised and not performing as originally intended. Certain sections require immediate attention/replacement.

Figure 21 presents the condition of the overall sanitary sewer network. The overall structural condition of South Stormont’s sanitary sewer system is “Good”. Maps 5A and 5B show the condition of the sanitary sewer network and identify the now deficient sewer lengths, i.e. pipes with a condition rating of fair or worse in 2013.

FIGURE 21 - CONDITION RATING DISTRIBUTION – SANITARY SEWERS



3.5 WATER AND SEWAGE TREATMENT PLANTS

3.5.1 *Asset Types*

The Township has two (2) water treatment plants, three (3) water pumping/booster stations, two (2) water towers, and two (2) sewage treatment plants. Table 27 presents a detailed listing of the asset types including their locations.

TABLE 27 – WATER AND SEWAGE TREATMENT PLANT BUILDINGS AND LOCATIONS

WATER TREATMENT	LOCATION
Water Treatment Plant	Long Sault
Water Treatment Plant	Newington
Low Lift Pumping Station	Long Sault
Booster Station	Ingleside
Booster Station	Eamers Corners/St.Andrews
Water Tower	St.Andrews
Water Tower	Ingleside
WASTEWATER TREATMENT	**LOCATION**
Sewage Treatment Plant	Long Sault
Sewage Treatment Plant	Ingleside
Total Number of Facilities	**9**

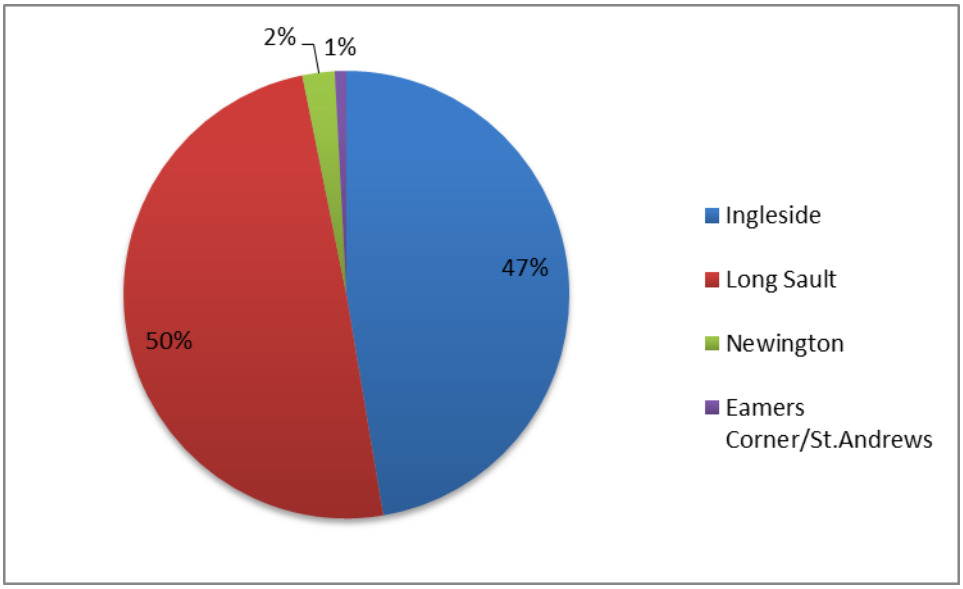
3.5.2 *Financial Accounting and Replacement Cost Valuation*

The total replacement value of the water and sewage treatment plants is $47.8 million in 2013 dollars, as presented in Table 28. Figure 22 shows the distribution of asset valuation over the different areas of the Township. The combined net book value of the sewer and water treatment plants is $11.80 million, as presented in Appendix B.

TABLE 28 – WATER AND SEWAGE TREATMENT PLANT REPLACEMENT COST VALUATION

Water Treatment	Location	Replacement Cost (2013)	% of Total
Water Treatment Plant	Long Sault	$ 11,156,257	23%
Water Treatment Plant	Newington	$ 1,106,346	2%
Low Lift Pumping Station	Long Sault	$ 1,442,309	3%
Booster Station	Ingleside	$ 1,442,309	3%
Booster Station	Eamers Corners/St.Andrews	$ 395,264	1%
Water Tower	St.Andrews	$ 435,753	1%
Water Tower	Ingleside	$ 506,699	1%
Wastewater Treatment	-	-	-
Sewage Treatment Plant	Long Sault	$ 10,843,022	23%
Sewage Treatment Plant	Ingleside	$ 20,494,226	43%
Total		**$ 47,822,186**	-

FIGURE 22 - ASSET VALUATION BY AREA - WATER AND SEWAGE TREATMENT PLANTS



3.5.3 *Asset Age and Remaining Life*

The age distribution of the various water and sewage treatment plant infrastructure is presented in Figure 23, while the average remaining service life for each type of asset is shown in Figure 24.

FIGURE 23 – WATER AND SEWAGE TREATMENT PLANT AGE DISTRIBUTION

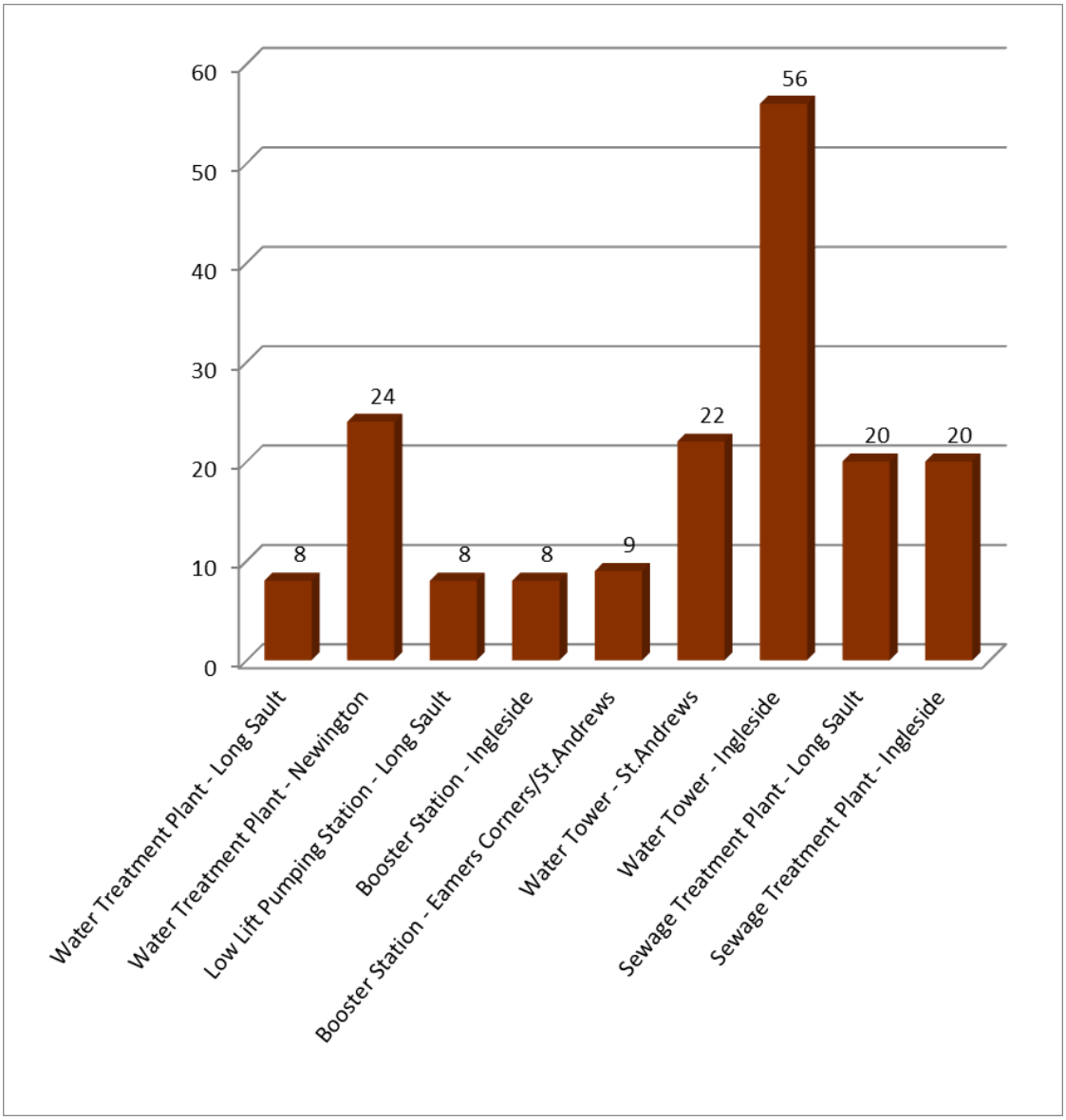
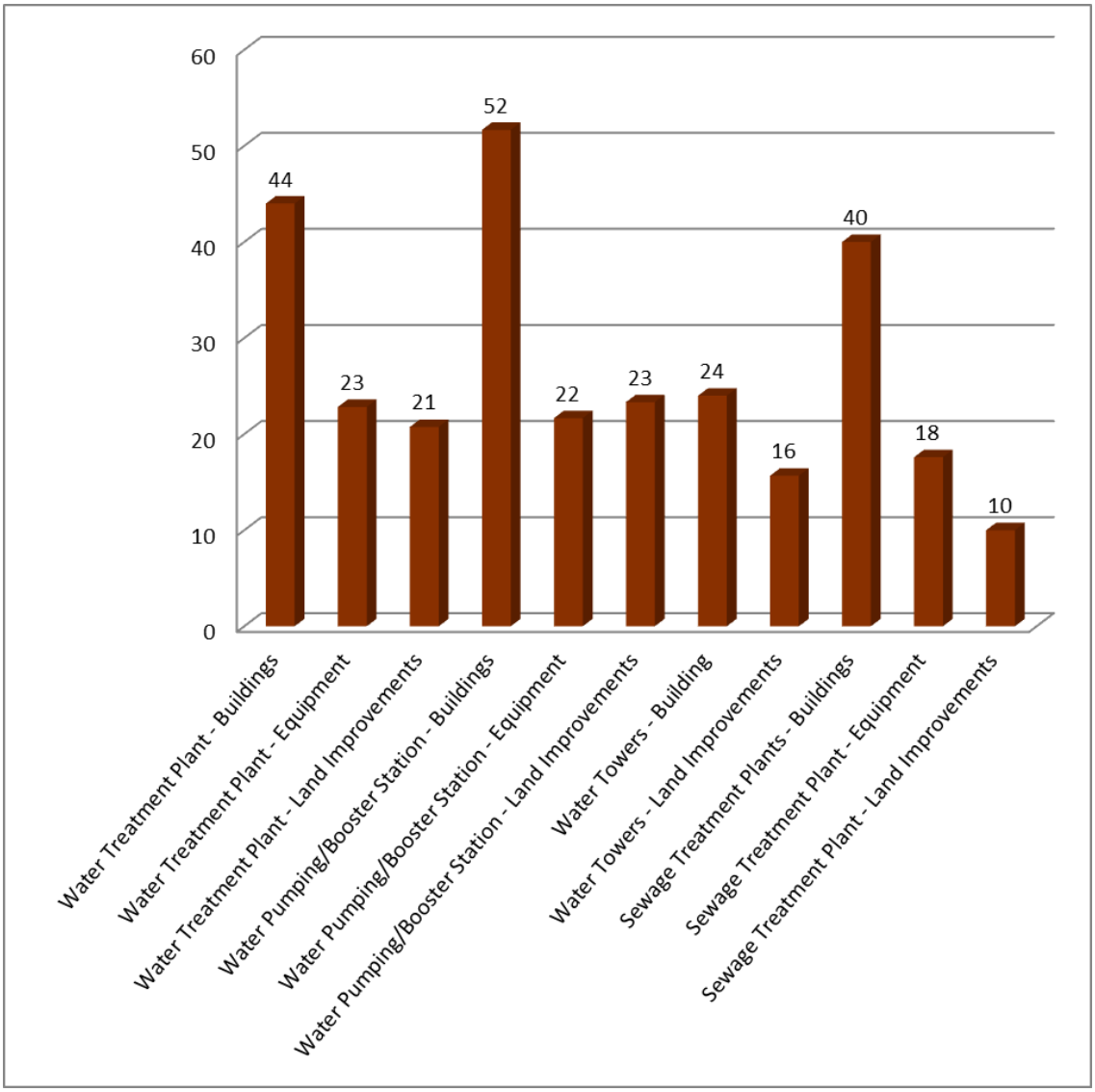


FIGURE 24 - AVERAGE REMAINING LIFE BY ASSET TYPE (YEARS)



3.5.4 *Asset Condition Rating*

The condition of each asset has been categorized as "Poor", "Fair", "Average" and "Good" based on the percent of service life remaining with adjustments to account for any upgrades or major maintenance performed since the original date the infrastructure was put in service. Typical service lives of infrastructure components are based on values provided in the Canadian Infrastructure Report Card (September, 2012). See Table 29 for the rating system.

TABLE 29 – CONDITION RATING FOR NON-LINEAR (DISCRETE) WATER AND WASTEWATER ASSETS (PLANTS, PUMPING STATIONS AND STORAGE TANKS)

CONDITION	DESCRIPTION
GOOD	More than 80% of service life remaining. Demand corresponds well to the design capacity; no operational problems experienced.
AVERAGE	Between 60% to 80% of service life remaining. Demand is within design capacity; occasional operational problems experienced
FAIR	Between 30% and 60% of service life remaining. Demand is approaching design capacity; significant operational problems occur frequently
POOR	Less than 30% of service life remaining. Demand exceeds design capacity; significant operational problems evident/eminent.

Table 30 presents the condition ratings of the various water and sewage treatment assets. The overall physical condition (replacement-cost weighted) of South Stormont's water and sewage treatment infrastructure is "Average".

TABLE 30 - CONDITION RATING DISTRIBUTION

ASSET TYPE	CONDITION RATING (REPLACEMENT-COST WEIGHTED)
Water Treatment Plants	GOOD
Pumping/Booster Stations	AVERAGE
Water Towers	FAIR
Sewage Treatment Plants	AVERAGE

4.0 ASSET MANAGEMENT STRATEGY

This section identifies the asset management strategies planned to sustain the assets at the desired level of service, including:

1. Non-infrastructure solutions,
2. Maintenance activities,
3. Renewal and reconstruction activities,
4. Disposal activities,
5. Expansion activities,
6. Procurement methods, and
7. Risks.

4.1 NON-INFRASTRUCTURE SOLUTIONS

The Stormont, Dundas and Glengarry (SDG) Official Plan guides public administrators and private interests towards the most desirable form of development under the anticipated conditions. It is the intent of the SDG Official Plan to provide the County and Local Municipalities with the mechanisms to plan for the cost-effective and efficient delivery of public services and infrastructure, to control the location and phasing of development based on the availability and capacity of services and to minimize or avoid land use conflicts arising from decisions on the location of facilities and infrastructure. The intent of the SDG Official Plan is to also provide for the planned investment in services as a measure to stimulate economic development and to provide for the long term prosperity of the County and its communities.

The goal for the Growth and Settlement of the United Counties of Stormont, Dundas and Glengarry Official Plan is:

> *"To achieve a compact and energy efficient land use pattern that optimizes the use of available or planned infrastructure (roads, water, sewage, waste disposal, utilities) and public service facilities (schools, health care, recreation and cultural facilities, fire, police and emergency services) and which uses densities and development standards which are cost effective and compatible with the prevailing and emerging character of settlement areas."*

Key objectives of the SDG Official plan are:

1. To provide and maintain an adequate supply of land for residential, recreational, open space, public service and employment uses to meet projected growth and development demands for the planning period of 20 years.
2. To provide for a full range of housing types and densities to meet demographic and market requirements of current and future residents of the County while maintaining at least a 10-year

supply of land designated and available for new residential development and residential intensification.

3. To designate land uses in urban and rural settlement areas and rural areas to accommodate development and redevelopment having regard for the health, safety, convenience and needs of the present and future population.
4. To maintain the well-being of downtowns and main streets in urban settlement areas.
5. To provide for a balanced opportunity for growth and settlement across the County.
6. To allow development where it can be adequately serviced within the existing capacity or planned expansion of public service facilities and infrastructure.
7. To protect sensitive land uses (dwellings, health care and educational facilities) from incompatible land uses and to avoid or resolve existing land use conflicts.
8. To conserve and protect natural heritage features and areas, as well asthe attributes of the natural landscape in the design, development and maintenance of land uses and land use activities.
9. To provide the land use planning framework to sustain existing employment and encourage and stimulate new economic development.

In conclusion, the SDG Official Plan will serve as a guide to control development in a cost-effective manner, while promoting development in areas where there is available capacity (i.e. maximizing the use of the current infrastructure in order to reduce costs in the long term).

4.2 MAINTENANCE ACTIVITIES

The operational budgets include maintenance tasks to optimize the life cycle of the infrastructure. For the road network asset, two maintenance strategies: (1) Rout and Seal and (2) Rejuvenating Oil, are proposed. The increased maintenance level will maintain the road condition at higher service levels and also reduce the long-term costs to sustain the infrastructure. These strategies have been included in the capital budget and are further described below.

4.2.1 *Rout and Seal*

Description:

Rout and seal involves routing of cracks to a standardized size, cleaning and heating of routed cracks with a lance, followed by hot poured rubberized asphalt including squeegee. By keeping the water out, it prohibits freeze/thaw reactions in winter, and guards against reduced strength due to water infiltration at other times, thus retarding the development of alligator cracks.

Life Extension: 3+ years

When to use:

Routing and sealing is typically used in earlier portions of a pavement's life cycle, with cracks less than 12mm in width and with less than 1,500 linear metres of cracks per kilometre of pavement. It is not normally used in single lift pavements over granular as it can promote full depth cracking where routed.

Cost: $1.50 – $2.50 per lineal metre.

4.2.2 *Rejuvenating Oil*

Description:

Rejuvenating oil penetrates an asphalt surface and restores the maltene to asphalt ratio. Following application and prior to traffic, a layer of manufactured sand is applied to provide temporary friction. This is subsequently swept up and reused.

Life Extension: 3+ years

When to use:

Typically around the seven to 10-year mark of a pavement's life cycle.

Cost: Approximately $1.50 per square metre.

4.3 RENEWAL AND RECONSTRUCTION ACTIVITIES

4.3.1 *Road Network*

4.3.1.1 Renewal and Reconstruction Strategy

The renewal and reconstruction strategy for preserving the road structure is presented in Table 31.

TABLE 31 – RENEWAL AND RECONSTRUCTION STRATEGY

SURFACE TYPE	ENVIRONMENT	LIFE-CYCLE YEAR	STRATEGY	AVERAGE CONDITION RATING
GRAVEL	RURAL	N/A	Maintain through regular gravel resurfacing	6.00
LCB (Surface Treatment)	RURAL	0	Construction of Asset	6.45
		8	Single Surface Treatment Overlay	
		19	Partial Depth Reconstruction	
		25	Single Surface Treatment Overlay	
		36	Partial Depth Reconstruction	
		42	Single Surface Treatment Overlay	
		55	Full-Depth Reconstruction	
HCB (Asphalt)	RURAL SEMI-URBAN	0	Construction of Asset	7.17
		8	Rejuvenating Oil	
		20	Asphalt Overlay	
		24	Rout and Seal Cracks	
		28	Rejuvenating Oil	
		52	Partial Depth Reconstruction	
		60	Rejuvenating Oil	
		68	Asphalt Overlay	
		72	Rout and Seal Cracks	
		76	Rejuvenating Oil	
		100	Full-Depth Reconstruction	
	URBAN	0	Construction of Asset	7.52
		4	Rout and Seal Cracks	
		8	Rejuvenating Oil	
		24	Asphalt Overlay	
		28	Rout and Seal Cracks	
		32	Rejuvenating Oil	
		56	Partial Depth Reconstruction	
		60	Rout and Seal Cracks	
		64	Rejuvenating Oil	
		75	Asphalt Overlay	
		79	Rout and Seal Cracks	
		83	Rejuvenating Oil	
		100	Full-Depth Reconstruction	

Based on the above-noted strategy, the ideal life cycle for each road type and environment has been developed and is presented in Appendix C. Table 32 summarizes the average condition rating over the life of the asset and the yearly life-cycle cost for each road type.

TABLE 32 - LIFE CYCLE CONDITION RATING AND COST

TYPE	ENVIRONMENT	AVERAGE CONDITION RATING OVER ASSET LIFE	LIFE CYCLE COST PER YEAR
SURFACE TREATMENT (LCB)	RURAL	6.45	$ 13,982
ASPHALT (HCB)	RURAL	7.17	$ 10,000
	SEMI-URBAN		$ 14,430
	URBAN	7.52	$ 21,500

In developing the priority of road improvements, the first consideration for the available funds is for preserving the road system. Improvements to preserve the surface will be timed in order to provide the best value for maintaining the asset. Where the road has deteriorated to the point that only major and costly improvements will restore the structural strength of the road, improvements will be timed in order to take full advantage of the remaining life of the infrastructure, but not to the extent were the road falls below Minimum Maintenance Standards.

The second major component in the decision matrix is the Average Annual Daily Traffic (AADT) which provides an indication on the number of users of the road network. Priority is given to roads with higher AADT. As an example, if one street is a dead end and one street is a minor collector, and both cost the same per kilometre to reconstruct, the minor collector would be selected over the dead end since it serves more commuters.

Other factors that may have to be considered are safety, truck traffic, development, economic, social, and timely scheduling of construction to coincide with other infrastructure works (e.g. sewers, watermain, etc.).

Section 4.3.1.2 presents a 10-year plan based on current spending levels and analyzes the adequacy of the current spending levels. Section 4.3.1.3 presents the optimum spending levels in order to maintain the condition of the road network at an optimum level of service based on the reconstruction strategy presented in Table 34.

4.3.1.2 Ten Year Plan Based on Current Spending Levels

The recommended 10-year plan based on current spending levels of $885,000/year is presented in Table 33 and is shown in Map 3. The “Type of Construction” codes are presented in Tables 4 to 7. Reconstruction is scheduled to coincide with the sewer and watermain projects recommended in sections 4.3.3 and 4.3.4.

Despite the Township planning to spend $8.8 million over the next 10 years, the road system will deteriorate from an overall condition rating of 5.71 to 4.93.

TABLE 33 – TEN-YEAR CAPITAL PLAN FOR ROAD RECONSTRUCTION ($1,000s)

No.	STREET NAME	KM	TYPE OF CONSTRUCTION	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
113	Otto Road	3.20	LCB - R2 + WIDEN (2014) / LCB-R1 (2018)	$ 608.00				$ 73.60					
201	Ouellette Avenue	0.40	HCB - S1 (2014) / HCB-S4 (2018) / HCB-S6 (2021)	$ 49.60				$ 1.60			$ 4.00		
202	Strachan Avenue	0.30	HCB - S1 (2014) / HCB-S4 (2018) / HCB-S6 (2021)	$ 37.20				$ 1.20			$ 3.00		
203	St. Laurent Avenue	0.40	HCB - S1 (2014) / HCB-S4 (2018) / HCB-S6 (2021)	$ 49.60				$ 1.60			$ 4.00		
204	Johnson Crescent	0.50	HCB - S1 (2014) / HCB-S4 (2018) / HCB-S6 (2021)	$ 62.00				$ 2.00			$ 5.00		
205	Gray Avenue	0.20	HCB - S1 (2014) / HCB-S4 (2018) / HCB-S6 (2021)	$ 24.80				$ 0.80			$ 2.00		
230	Mack Street	0.40	HCB - S1 (2014) / HCB-S4 (2018) / HCB-S6 (2021)	$ 49.60				$ 1.60			$ 4.00		
190	Maxwell Avenue	0.50	HCB - S3 (2015)		$ 479.20								
209	Plaza Street	0.10	HCB - S3 (2015) / HCB-S4 (2019) / HCB-S6 (2022)		$ 88.00				$ 0.40			$ 1.00	
236	Crystal Street	0.15	HCB - S1 (2015) / HCB-S4 (2019) / HCB-S6 (2022)		$ 18.60				$ 0.60			$ 1.50	
016A	Guindon Road	0.30	DITCHING + 50mm G.A. (2015)		$ 9.90								
016B	Guindon Road	0.20	PULVERIZE + DITCHING + 50mm G.A. (2015)		$ 6.60								
174A	Pine Street	0.70	HCB-S4 (2015)		$ 2.80								
231	Alguire Street	0.50	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 62.00			$ 2.00				$ 5.00	
232	Melba Street	0.25	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 31.00			$ 1.00				$ 2.50	
233	Sunnyview Avenue	0.50	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 62.00			$ 2.00				$ 5.00	
234	Virgina Street	0.20	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 24.80			$ 0.80				$ 2.00	
235	St. James Street	0.20	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 24.80			$ 0.80				$ 2.00	
238	Joseph Street	0.30	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 37.20			$ 1.20				$ 3.00	
246	Virgina Street	0.15	HCB - S1 (2015) / HCB-S4 (2018) / HCB-S6 (2022)		$ 18.60			$ 0.60				$ 1.50	
040B	Atchenson Road	1.35	LCB - R1 (2016)			$ 31.05							
183	Elm Street	0.50	HCB - S3 (2016)			$ 439.90							
237	Marydale Avenue	1.30	HCB - S1 (2016) / HCB-S4 (2019) / HCB-S6 (2023)			$ 161.20			$ 5.20				$ 13.00
241	Daisy Street	0.30	HCB - S1 (2016) / HCB-S4 (2019) / HCB-S6 (2022)			$ 37.20			$ 1.20			$ 3.00	
242	Rosedale Avenue	0.40	HCB - S1 (2016) / HCB-S4 (2019) / HCB-S6 (2022)			$ 49.60			$ 1.60			$ 4.00	
243	Jean Street	0.30	HCB - S1 (2016) / HCB-S4 (2019) / HCB-S6 (2022)			$ 37.20			$ 1.20			$ 3.00	
244	Thomas Street	0.40	HCB - S1 (2016) / HCB-S4 (2019) / HCB-S6 (2022)			$ 49.60			$ 1.60			$ 4.00	
249	Cheryl Street	0.45	HCB - S1 (2016) / HCB-S4 (2019) / HCB-S6 (2022)			$ 55.80			$ 1.80			$ 4.50	
006	Delaney Road	2.20	LCB - R1 (2017)				$ 50.60						
013	McPhail Road	2.40	LCB-R1 (2017)				$ 55.20						
040C	Atchison Road	1.55	LCB - R1 (2017)				$ 35.65						
065	Valade Road	3.10	LCB - R1 (2017)				$ 71.30						
068A	Windfall Road	2.50	LCB - R1 (2017)				$ 57.50						
074B	Northfield Road	2.10	LCB - R1 (2017)				$ 48.30						
109B	Bush Glen/Otto Road	0.40	HCB - R2 + WIDEN (2017)				$ 102.80						
110B	May Road	1.30	LCB - R2 + WIDEN (2017) / LCB-R1 (2022)				$ 247.00					$ 29.90	
110C	May Road	1.50	LCB - R1 (2017)				$ 34.50						
239	Philip Street	0.15	HCB - S1 (2017) / HCB-S4 (2020) / HCB-S6 (2023)				$ 18.60			$ 0.60			$ 1.50
240	Yolanda Street	0.35	HCB - S1 (2017) / HCB-S4 (2020) / HCB-S6 (2023)				$ 43.40			$ 1.40			$ 3.50
245	Bruce Street	1.00	HCB - S1 (2017) / HCB-S4 (2019) / HCB-S6 (2023)				$ 124.00		$ 4.00				$ 10.00
011	North Branch Road	1.80	LCB-R3 (2018) / LCB-R1 (2023)					$ 806.40					$ 41.40
087	Eamon Road	1.70	LCB - R1 (2018)					$ 39.10					
145	Stuart Road	0.10	HCB-R1 (2018)					$ 9.50					
003	Island Road	0.10	LCB - R1 (2019)						$ 2.30				
004	Island Road	2.20	LCB - R2 + WIDEN (2019)						$ 418.00				
143	Windermere Drive	0.35	HCB - R3 (2019)						$ 199.15				
182	Railway Street	0.30	HCB - S3 + 150mm G.B. + 50mm ASP (2019) / HCB-S4 (2022)						$ 264.00			$ 1.20	
044	MacMillan Corners Road	0.90	LCB - R2 + WIDEN (2020)							$ 171.00			
062A	Myers Road	1.00	HCB - R2 + WIDEN (2020)							$ 257.00			
062B	Myers Road	0.70	HCB-R1 (2020)							$ 66.50			
146	Manning Road	2.60	HCB-S1 (2020)							$ 322.40			
164	Maple Street	0.65	HCB-S6 (2020)							$ 6.50			
124A	North Lunenburg Road West	4.40	LCB-R2 + WIDEN (2021)								$ 836.00		
089C	Dafoe Road	2.10	HCB - R2 + WIDEN (2022)									$ 539.70	
167	Memorial Square East	0.25	HCB-U2 (2022)									$ 110.25	
168	Memorial Square West	0.25	HCB-U2 (2022)									$ 110.25	
089A	Dafoe Road	1.20	HCB-R1 (2023)										$ 114.00
089B	Dafoe Road	3.10	HCB - R2 + WIDEN (2023)										$ 796.70
-	-	-	Road Needs Study (2016) (2021)			$ 20.00					$ 20.00		
	TOTAL			**$ 880.80**	**$ 865.50**	**$ 881.60**	**$ 888.90**	**$ 872.20**	**$ 901.10**	**$ 825.40**	**$ 878.00**	**$ 833.30**	**$ 980.10**

4.3.1.3 Optimum 10-Year Program

Additional spending is required to improve the road network such that its overall condition rating is optimized. The additional spending required to improve the condition of the road network such that it reaches an optimum overall rating by year 10 is presented in Table 34.

TABLE 34 – SUMMARY OF ADDITIONAL WORK OVER 10 YEARS IN ORDER TO ACHIEVE OPTIMUM CONDITION RATING ($1000s)

CODE	DESCRIPTION	km	Cost
SURFACE TREATMENT OR LOW COST BITUMINOUS (LCB)			
LCB-R1	**Resurfacing** Single surface treatment 6.0m wide	23.20	$ 533.60
LCB-R2	**Partial Depth Reconstruction** Pulverize or scarify, 50-150mm G.A., double surface treatment, 10% spot drainage improvements, culvert replacement & 10% contingency	21.41	$ 2,697.40
ASPHALT OR HIGH COST BITUMINOUS (HCB) - RURAL ROADS			
HCB-R1	**Resurfacing** 40mm lift of HL3 asphalt by 6.0m and 10% contingency	14.75	$ 1,401.25
HCB-R2	**Partial Depth Reconstruction** Pulverize, 50-150mm G.A., 50mm lift of HL4 asp, shouldering, 10% spot drainage improvements, culvert replacement & 10% contingency	17.45	$ 3,367.85
HCB-R3	**Full Depth Reconstruction** Remove asphalt, earth exc., 150mm G.A., 300mm G.B., 50mm Lift of HL4 asphalt, shouldering, culvert replacement, engineering, geotechnical and 10% contingency	0.50	$ 284.50
HCB-R4	**Rout and Seal** Routing of cracks	8.75	$ 35.00
HCB-R6	**Rejuvenating Oil** Oil that penetrates an asphalt surface and restores the Maltene to asphalt ratio	4.95	$ 49.50
ASPHALT OR HIGH COST BITUMINOUS (HCB) - SEMI-URBAN ROADS			
HCB-S1	**Resurfacing** 40mm lift of HL3 asphalt by 6.0m wide, adjust iron, asphalt keys, tie-in driveways and 10% contingency	9.90	$ 1,227.60
HCB-S2	**Partial Depth Reconstruction** Remove asphalt, earth exc., 150mm G.A., 50mm lift of HL4 asphalt, shouldering, adjust iron, tie-in driveways, road culvert replacement, 10% spot drainage and 10% contingency	4.65	$ 1,241.55
HCB-S4	**Rout and Seal** Routing of cracks	7.55	$ 30.20
HCB-S6	**Rejuvenating Oil** Oil that penetrates an asphalt surface and restores the Maltene to asphalt ratio	4.95	$ 49.50
ASPHALT OR HIGH COST BITUMINOUS (HCB) - URBAN ROADS			
HCB-U1	**Resurfacing** 40mm lift of HL3 asphalt by 8.5m wide, adjust iron, milling and 10% contingency	1.00	$ 197.00
HCB-U4	**Rout and Seal** Routing of cracks	1.00	$ 10.00
HCB-U6	**Rejuvenating Oil** Oil that penetrates an asphalt surface and restores the Maltene to asphalt ratio	0.90	$ 38.70
	Total:	**120.96**	**$ 11,163.65**

Based on the foregoing, an additional $11.2 million will be required in order to raise the overall condition rating of the road network to an optimum level.

4.3.2 *Bridges and Structural Culverts*

4.3.2.1 Renewal and Reconstruction Strategy

The goals of the detailed visual inspection are to ensure that (1) the municipal structures remain at an acceptable level of safety, (2) the useful life of the structures are prolonged, (3) maintenance and rehabilitation needs are identified, and (4) the Township has adequate information to economically plan for studies, repairs and/or replacement of their infrastructure.

4.3.2.2 Ten Year Plan

The recommended 10-Year Capital Plan is presented in Table 35 on the next page. Estimates include engineering and contingencies, but do not include taxes. Estimates are in 2013 Dollars and it is therefore important to add appropriate construction inflation each year when budgeting.

TABLE 35 – CAPITAL WORK PROGRAM ($1,000s)

SITE NO.	DESCRIPTION	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
167	N.Lunnenburg Rd. West • Remove and replace o Geotech. investigation, design & tender o Construction o Construction supervision & contingency allowance			$ 32	$ 319 $ 64						
169	N.Lunnenburg Rd. West • Remove and replace o Geotech. investigation, design & tender o Construction o Construction supervision & contingency allowance						$ 32	$ 319 $ 64			
175	Valade Road • Detailed deck condition survey										
181	Lefave Road (Red Bridge) • Detailed deck condition survey										
A02	Hunters Road • Remove and replace o Geotech. investigation, design & tender o Construction o Construction supervision & contingency allowance				$ 32	$ 319 $ 64					
	OSIM Inspections	$ 2	$ 10	$ 2	$ 8	$ 2	$ 9	$ 2	$ 8	$ 2	$ 10
	Enhanced OSIM Inspections						$ 12				
	TOTAL	**$ 2**	**$ 10**	**$ 34**	**$ 423**	**$ 385**	**$ 53**	**$ 385**	**$ 8**	**$ 2**	**$ 10**

The Ontario Structure Manual and Canadian Highway Bridge Design Code, CAN/CSA-S6-06 set out the requirements for a barrier across a structure. Rehabilitation of the structure typically triggers the requirement to upgrade the barrier across the structure to current design standards. The Ontario Geometric Design Guide sets out the requirements for the installation of steel beam guide rail for approaches. This report identifies structures that may not meet the current design standards. Upgrading roadside safety is fully justified when vehicular volumes are high. However, when traffic volumes are low and there is no existing accident experience at the site, this justification may be questioned.

As most municipalities have limited financial resources, under these circumstances a risk analysis should be undertaken. This analysis is required because the funds spent on a safety issue, such as installing guide rail on a bridge approach, may mean that adequate resources are then not available to be spent on another safety need elsewhere in the Township. Under the requirements for a thorough bridge inspection, the need for guide rail or the need to upgrade existing guide rail must be identified. However, as only the Township can decide on the risk management assessment, the decision to actually install or upgrade the guide rail must remain with the Township. Table 36 lists roadside safety improvements. The costs for any guiderail construction decided by the Township will have to be added to Table 35 – Capital Work Program. Structures identified for rehabilitation will be governed by the Bridge Code and the capital cost for barrier and steel beam guide rail improvements will have already been included in Table 35.

TABLE 36 – ROADSIDE SAFETY IMPROVEMENTS

SITE NO.	Road	DESCRIPTION
167	N.Lunnenburg West	No SBGR across structure and for approaches.
169	N.Lunnenburg West	No SBGR across structure and for approaches.
175	Valade	SBGR approach length and end treatment should be reviewed.
181	Lefave	SBGR approach length and end treatment should be reviewed.
187	McPhail	SBGR approach length and end treatment should be reviewed.
A01	Goldfield	No SBGR across structure and for approaches.
A02	Hunter	No SBGR across structure and for approaches.
A04	Hart	No SBGR across structure and for approaches.
A05	Bruining	SBGR approach length and end treatment should be reviewed.
A06	Beckstead	No SBGR across structure and for approaches.
A07	Pleasant Valley	No SBGR across structure and for approaches
A08	Anderson	No SBGR across structure and for approaches.
A09	Waldroff	No SBGR across structure and for approaches.
A12	Cooper	SBGR approach length and end treatment should be reviewed.
A13	Wilburn	No SBGR across structure and for approaches.
A15	MacRae	No SBGR across structure and for approaches.
A16	Northfield	No SBGR across structure and for approaches.
A17	Myers	SBGR approach length and end treatment should be reviewed.
A18	O'Keefe	SBGR approach length and end treatment should be reviewed
A19	Willy Bill	SBGR approach length and end treatment should be reviewed.

The typical costs to improve roadside safety based on the road conditions above are as follows:

1. Installing steel beam guide rail on approaches complete with end treatments is $55,000.
2. Replacing barrier system across structure with thrie beam and install steel beam guide rail on approaches complete with proper end treatments is $90,000.

4.3.3 *Water Distribution System*

4.3.3.1 Renewal and Reconstruction Strategy

The first consideration for the renewal and reconstruction strategy of the water distribution system is to ensure replacement is scheduled around the time the system reaches the end of its expected service life. In most cases, hydrants and valves are replaced in conjunction with the watermains; however it may be necessary to replace some appurtenances individually in cases where the watermain is still in good condition when they are due for replacement.

An analysis of the age distribution and average remaining service life of the Township's watermains shows that, although a portion of the system is in the later stages of its expected service life, none of the watermains will reach the end of their expected service life within the time forecasted by this report. As a result, the reconstruction strategy for the system is based on an approach which aims to take advantage of the benefits associated with co-ordinating watermain reconstruction projects with other scheduled sewer and road works. Through timely scheduling, synchronized reconstruction should provide the means for renewing a portion of the aging water distribution system while minimizing the cost and disruption normally associated with work of this scope.

Section 4.3.3.2 presents a 10-year plan for watermain reconstruction which aims to coincide with road and sewer works in the same area.

4.3.3.2 Ten Year Plan

The recommended 10-year plan for watermain reconstruction based on scheduled road and sewer works is presented in Table 37.

TABLE 37 – TEN-YEAR CAPITAL PLAN FOR WATERMAIN RECONSTRUCTION ($1,000s)

Asset ID	Street	Age (yrs)	Type of Construction	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
190	Maxwell Ave.	55	Full Depth Replacement (535m)		$184								
191	Maxwell Ave.	55											
194	Maxwell Ave.	55											
280	Maxwell Ave.	55											
270	Elm St.	55	Full Depth Replacement (530 m)			$173							
271	Elm St.	55											
272	Elm St.	55											
Water Meter Conversion to Radio Frequency											$180	$180	$180
Asset Management Study Update								$ 5					$ 5
Total				**$-**	**$184**	**$173**	**$-**	**$ 5**	**$-**	**$-**	**$180**	**$180**	**$185**

4.3.4 *Sanitary Sewer Collection System*

4.3.4.1 Renewal and Reconstruction Strategy

In developing the priority of sanitary sewer pipe improvements, the first consideration for available funds is for repairs to sewer lengths that exhibit a high number of severe structural deficiencies. In certain cases the number of repairs on a section of pipe warrants full replacement when life-cycle costs are considered. The other consideration for full replacement is the condition of the adjacent watermain infrastructure and road. When all three components are reviewed it is sometimes more cost effective and less disruptive to users to replace all three at the same time.

4.3.4.2 Ten Year Plan

The recommended 10-year plan for sanitary sewer repair and replacement is presented in Table 38 and is shown in Maps 6A and 6B, for repairs and replacement in Ingleside and Long Sault, respectively.

TABLE 38 – TEN-YEAR CAPITAL PLAN FOR SANITARY SEWER RECONSTRUCTION

Asset ID	Street	From MH	To MH	Length (m)	Condition	Type Of Construction	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
190	Simcoe St.	MH91	MH90	90.0	Very Poor	Spot Repairs	$ 29,060									
191	Simcoe St.	MH91	MH92	91.6	Poor	Spot Repairs	$ 14,000									
193	Simcoe St.	MH96	MH97	53.9	Poor	Spot Repairs	$ 6,400									
195	Simcoe St.	MH40	MH41	90.9	Fair	Spot Repairs	$ 19,320									
196	Simcoe St.	167	168	104.3	Fair	Spot Repairs	$ 12,060									
65	Maxwell Ave.	175	174	112.0	Good	Full Depth Replacement (535m)		$ 285,300[1]								
66	Maxwell Ave.	174	173	108.8	Poor											
67	Maxwell Ave.	173	172	109.0	Good											
68	Maxwell Ave.	172	171	96.2	Average											
69	Maxwell Ave.	171	170	107.8	Severe											
60	Elm St.	176	179	107.0	Good	Full Depth Replacement (530 m)			$ 281,100[2]							
61	Elm St.	179	180	105.6	Poor											
62	Elm St.	180	181	100.0	Poor											
63	Elm St.	181	182	100.5	Poor											
64	Elm St.	182	189	121.3	Good											
228	Saunders St.	MH35	MH37	73.1	Poor	Spot Repairs				$ 6,000						
111	College St.	231	210	109.6	Poor	Spot Repairs				$ 14,400						
115	College St.	234	235	43.4	Poor	Spot Repairs				$ 4,800						
126	Pine St.	268	260	118.8	Poor	Spot Repairs				$ 2,400						
128	Pine St.	MH77	MH78	110.2	Fair	Spot Repairs				$ 18,460						
216	Milles Roches Rd.	MH41	MH42	91.4	Poor	Spot Repairs						$ 28,000				
214	Milles Roches Rd.	168	169	105.0	Fair	Spot Repairs						$ 7,200				
215	Milles Roches Rd.	MH45	MH46	87.1	Fair	Spot Repairs						$ 8,060				
218	Milles Roches Rd.	MH43	MH44	93.0	Poor	Spot Repairs							$ 16,920			
198	Milles Roches Rd.	MH28	MH29	89.3	Fair	Spot Repairs							$ 14,700			
47	Santa Cruz Dr.	MH101	MH99	90.6	Fair	Spot Repairs								$ 20,860		
48	Santa Cruz Dr.	MH98	MH99	63.5	Fair	Spot Repairs								$ 34,860		
268	Johnson Cr.	MH39	MH40	86.1	Fair	Spot Repairs									$ 62,060	
248	Ouellette Ave.	267	266	95.0	Fair	Spot Repairs									$ 11,200	
						Sanitary Flushing and CCTV Inspection	-				$ 100,000					$ 100,000
						Asset Management Study Update	-				$ 20,000					$ 20,000
						Total	**$ 80,840**	**$ 285,300**	**$ 281,100**	**$ 46,060**	**$ 120,000**	**$ 43,260**	**$ 31,620**	**$ 55,720**	**$ 73,260**	**$ 120,000**

4.3.5 *Water and Sewage Treatment Plants*

4.3.5.1 Renewal and Reconstruction Strategy

The first consideration for the renewal and reconstruction strategy of the water and sewage treatment plants is to ensure replacement is scheduled around the time the components reach the end of their expected service life. Although treatment plants have been assigned a service life, South Stormont's water and sewage treatment plants are comprised of multiple individual components, all which ensure the plants provide the desired level of service. Each plant's individual components are replaced or serviced based on the recommended manufacturer's schedule; in many cases, this signifies that it may be necessary to replace some appurtenances individually prior to reaching the asset's expected service life.

An analysis of the age distribution and average remaining service life of the Township's water and sewage treatment assets shows that, although a portion of the system is in the later stages of its expected service life, none of the infrastructure will reach the end of its expected service life within the time forecasted by this report. As a result, the renewal/reconstruction strategy for the system is based on an approach which aims to maintain the desired level of service by allocating an annual expenditure amount to the scheduled servicing or replacement of current minor capital infrastructure as recommended by the manufacturer. Through timely scheduling, this should allow for the on-going renewal/replacement of the various components, thus ensuring the desired level of service is maintained while also extending the remaining service life of the assets. The 10-year plan also incorporates specific predetermined capital expenditures to address identified needs to ensure accurate financial planning.

4.3.5.2 Ten Year Plan

The recommended 10-year plan for water and sewage treatment plant repair and replacement is presented in Table 39 below.

TABLE 39 – TEN-YEAR CAPITAL PLAN FOR WATER AND SEWAGE TREATMENT PLANT REPAIR AND REPLACEMENT

ASSET	TYPE OF EXPENDITURE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WATER TREATMENT PLANT - LONG SAULT	SCADA Upgrade										$ 20,000
	Chlorine Pumps	$ 10,000	$ 10,000								
	ZeeWeed Cartridges Replacement	$ 120,000	$ 120,000		$ 140,000						
	Upgrade Internet Firewall		$ 6,500								
	On-going Minor Capital	$ 68,053	$ 69,414	$ 70,802	$ 72,218	$ 73,663	$ 75,136	$ 76,639	$ 78,172	$ 79,735	$ 81,330
LOW LIFT PUMPING STATION - LONG SAULT	On-going Minor Capital	$ 8,798	$ 8,974	$ 9,154	$ 9,337	$ 9,523	$ 9,714	$ 9,908	$ 10,106	$ 10,308	$ 10,515
INGLESIDE BOOSTER STATION - INGLESIDE	On-going Minor Capital	$ 8,798	$ 8,974	$ 9,154	$ 9,337	$ 9,523	$ 9,714	$ 9,908	$ 10,106	$ 10,308	$ 10,515
WATER TOWER - INGLESIDE	Capital improvements (as per Ingleside Multi-Legged Tower - Water Storage Facility Report, Landmark, 2011)	$ 70,250									
		$ 3,091	$ 3,153	$ 3,216	$ 3,280	$ 3,346	$ 3,413	$ 3,481	$ 3,550	$ 3,621	$ 3,694
WATER TREATMENT PLANT - NEWINGTON	Cartridge Tanks Replacement		$ 25,000								
	Mini SCADA System Replacement				$ 15,000						
	Pressure Tanks and Piping Replacement					$ 30,000					
	On-going Minor Capital	$ 13,260	$ 13,525	$ 13,796	$ 14,072	$ 14,353	$ 14,640	$ 14,933	$ 15,232	$ 15,536	$ 15,847
SEWAGE TREATMENT PLANT - LONG SAULT	PLC upgrades		$ 60,000								
	Biofilter Material Replacement				$ 10,000						
	SCADA Upgrade								$ 20,000		
	Blower					$ 15,000					
	ATAD Aerators and Foam Cutters			$ 25,000							
	Upgrade Internet Firewall	$ 6,500									
	On-going Minor Capital	$ 40,800	$ 41,616	$ 42,448	$ 43,297	$ 44,163	$ 45,046	$ 45,947	$ 46,866	$ 47,804	$ 48,760
SEWAGE TREATMENT PLANT - INGLESIDE	Two Blowers				$ 15,000				$ 15,000		
	SCADA Updgrade								$ 20,000		$ 20,000
	PLC Upgrades		$ 70,000		$ 70,000						
	Upgrade Internet Firewall	$ 6,500									
	On-going Minor Capital	$ 71,400	$ 72,828	$ 74,285	$ 75,770	$ 77,286	$ 78,831	$ 80,408	$ 82,016	$ 83,656	$ 85,330
WATER TOWER - ST.ANDREWS	Capital improvements (as per St. Andrews Composite Elevated Tank, Potable Water Storage Facility Report, Landmark, 2012)		$ 198,500								
	Install Security Fence		$ 10,400								
	On-going Minor Capital	$ 5,616	$ 5,728	$ 5,843	$ 5,960	$ 6,079	$ 6,200	$ 6,324	$ 6,451	$ 6,580	$ 6,712
BOOSTER STATION - EAMERS CONVERS/ST.ANDREWS	Mini SCADA System Replacement				$ 15,000						
	On-going Minor Capital	$ 5,094	$ 5,196	$ 5,300	$ 5,406	$ 5,514	$ 5,624	$ 5,737	$ 5,852	$ 5,969	$ 6,088
Asset Management Study Update						$ 15,000					$ 15,000
	TOTAL	**$ 438,160**	**$ 729,808**	**$ 258,996**	**$ 503,676**	**$ 303,450**	**$ 248,319**	**$ 253,285**	**$ 313,351**	**$ 263,518**	**$ 323,788**

4.4 DISPOSAL ACTIVITIES

No disposal activities are planned over the next 10 years.

4.5 EXPANSION ACTIVITIES

The SDG Official Plan sets the policy for planned expansion activities. For further details please refer to Section 4.1 of this Study and the United Counties of Stormont, Dundas and Glengarry Official Plan.

4.6 PROCUREMENT METHODS

It is important to consider a variety of procurement methods to ensure the most cost-effective allocation of the Township's resources. Some examples include working with other municipalities to combine resources for cost savings on:

- Culverts,
- Asphalt,
- Signs and sign posts,
- Line Painting,
- Misc. Asphalt Painting,
- Dust Suppressant,
- Crack Sealing,
- Road Salt,
- Winter plow parts, and
- Grader Blades.

The Township is currently investigating joint purchases of chemicals for the sewer and water treatment. The procurement policy for The Township can be found in its entirety under By-Law No. 2008-98, as amended from time to time.

4.7 RISKS

The biggest risk to the Township is inadequate spending towards maintenance and rehabilitation of its assets. The consequences of underfunding include the steady degradation of assets resulting in a reduction of associated service levels. The consequences also include escalating repair and maintenance costs, as replacing any asset in a state of failure is much more costly than rehabilitation of minor deficiencies. In addition to potential increases in maintenance costs over their lifecycle, failure to implement the necessary risk mitigation strategies can pose a risk to public safety as well as the environment in the case of drinking water distribution and wastewater management assets.

It is recommended that the following actions be taken to help reduce these risks:

1. Adopt the 10-Year Capital Plans for Road Reconstruction, Water and Sewer System Repairs and Water and Wastewater Treatment Plant Upgrades as presented.
2. Complete additional work listed as more funds become available.
3. Continue regular monitoring and valuation of assets and their condition.

Implementing the recommended risk mitigation strategies helps to ensure reconstruction and maintenance activities are focused on areas in greatest need of repair. These strategies also ensure opportunities to promote increased levels of service with reduced capital cost are not missed. Additionally, identifying and addressing deficiencies in a timely manner reduces the likelihood of asset conditions deteriorating to a point where emergency repairs may be necessary. Furthermore, timely rehabilitation of assets not only reduces risks to public safety associated with their failure but also improves service levels while reducing long term costs.

5.0 FINANCING STRATEGY

5.1 ROAD INFRASTRUCTURE

5.1.1 *Economic Environment*

Historically, road infrastructure has been funded from taxation and government grants. Increased obligations for services have stretched the demands for the tax dollar. The municipal tax levy has increased from $3.61 million in 2009 to $4.66 million in 2013, an increase of 29% over a four year period. Growth related assessment for the four year period was approximately 7%. One can assume 22% of the levy increase was primarily for rising costs for service responsibilities.

In 2013, property taxes on an average household (assessment $179,500) are $2,260. The 2011 Ministry of Finance OMPF information (based on Statistics Canada) indicates the median household income as $68,547 compared to the Ontario median income of $73,290. Estimating after tax income of $58,200 would have property taxes as 3.9% of median household income.

In recent years, a sustainable source of infrastructure funding has been the Federal Gas Tax Grant. The funding has allowed the continual improvement of the road infrastructure. The Federal government has committed to the continuation of the funding, however, the annual amount is expected to decrease as it is tied to population growth and Ontario will be receiving a lower proportion of funds. As the new funding agreement is not known, the financing projections have maintained the gas funding at the current amount.

5.1.2 *Regulatory Environment/Financial Flexibility*

The Province has established core services for which municipalities are responsible as well as regulatory requirements for service standards. One significant area is road and bridge infrastructure. The net expenditure for roads and bridges in the 2013 budget is $2.67 million or 57% of the levy.

The Province has established Minimum Maintenance Standards for roads. As a “best practices” approach, the Township has undertaken a road needs study which provides the following:

Systematic Approach

- Roads prioritized based on needs
- Limited resources allocated to cost-effective projects
- Council can justify why a road was or was not selected for improvements

Long Term Strategy

- Tax dollars will be spent strategically
- Government grant availability may be optimized
- Ten year plan spans between terms of Council

Benchmark

- Ability to project future adequacy of the road system
- Comparability to other municipalities
- Justification for tax increase and/or shifting priorities to address spending shortfalls

The Province sets out the standards for bridge inspections in accordance with the Ontario Structure Inspection manual.

Clearly, this plan is the foundation step for moving forward with forecasts for the replacement and rehabilitation activities associated with road and bridge infrastructure in the Township.

5.1.3 *Financial Plan*

The attached financial models (Appendix E, Tables E.1-E.2) explore a 10-year capital plan for maintaining the most cost-effective approach for delivering services at acceptable levels, assuming the lowest risk possible. A proactive approach including condition assessment studies will provide meaningful management information for decision making. In this manner, repair and replacement work can be assessed and completed on a timely basis to avoid the possibility of system failure.

Table E.2 sets out the capital expenditures over a 10-year period, based on expenditures set out in Section 4 of the report. Table E.1, the Financial Plan, includes the capital expenditures identified in Table E.2 and the funding sources available. Funding sources include funds from reserves, proceeds of long-term debt and government grants. As long term debt creates an obligation on future revenues, the repayment of long-term debt is considered a commitment of future resources. The annual funding shortfall is calculated as the difference between required expenditures and the available sources of funding.

The continuity of reserves presented in Table E.1 is included to add clarification regarding funding sources available. The financial plan includes funds allocated for capital projects to accumulate within the reserve. As funds are required for capital expenditures and debt repayment, they are withdrawn from the reserve.

5.1.4 *Assumptions*

The assumptions, both general and specific, for the financial models are included in Table 40.

TABLE 40 – ASSUMPTIONS FOR THE FINANCIAL MODEL

Risk Factors	Considerations
Interest Rate	Debt repayment on existing debt is based on the fixed rate associated with the debt. Annual updates to this plan, which is a "living" document, would include a review of the borrowing rates. Interest on reserves has been calculated at 2% (prime less 1%).
Inflation	No inflation factor has been included in the model for Years 2014-2015 as costs are broad estimates and could be incurred within as short a time frame as two years. For midrange expenditures (three- to 10 year period), inflation has been estimated at 4% per year based on simple interest. The risk for inflation estimates increases in longer term projections.
Discounting to Present Value	The future value of replacement costs are calculated at 4% compounding inflation rate. The risk in the inflation estimate is the potential for increased service standards and the inflation indices for construction outpacing standard inflation. To determine the present value investment of funds, required interest rates are estimated at 2%.
Allocation to Reserves	The annual allocation to reserves is based on an estimate of historical spending. Annual increases are an estimate of inflation and growth. Interest income is allocated to reserves based on the opening reserve balance.
Capitalization Threshold	Generally, preventative maintenance activities are not considered capital and are not included in the long term capital plan. The annual costs for gravel roads are included as an annual operating cost and are not included in the capital forecast.
Disposals	Disposals do not provide for any significant source of funding as the equipment would be obsolete at the time of replacement. The costs to remove infrastructure are included in the reconstruction costs.

5.1.5 *Funding Requirements*

The Township has committed a regular investment towards preventative maintenance as set out in the historical costs in Table E.3.

The current spending on road infrastructure will result in a decline in the overall average road condition rating. To achieve an optimum average road condition rating an additional $1.12 million to the annual levy would be required. This funding shortfall is set out in Table E.1.

Short term expenditures include condition assessment studies. As the intent of the asset management plan is to be a "living" document, the results of the inspection and assessment reports could impact the annual review.

The current rating for bridges and culverts is good. A best practices approach would include forecasting costs for the entire life of assets.

Life cycle costing involves projecting the future replacement costs (estimating inflation) and then calculating an annual investment to meet that future expenditure.

The current replacement costs for bridges and culverts are $7.15 million and $1.5 million. The average remaining life is 54 years for bridges and 26 years for culverts. Estimating inflation at 4% (as the construction index tends to outpace annual inflation) the replacement costs for bridges will be $62.8 million and culverts will be $4.3 million. To fund the future replacement would require an annual investment of $744,000.

5.1.6 *Sources of Funding*

5.1.6.1 Taxation

To maintain the road rating at an optimum rating would create an annual funding shortfall of approximately $1.12 million per year. A 1% tax rate increase raises $46,640. This would equate to a 24% tax increase. A fully funded financial strategy to address the backlog of road renewal remains beyond the socially and political acceptable financial capacity of the current property tax system.

5.1.6.2 Development Charges

The Township may consider the implementation of development charges which are intended to fund infrastructure related to new growth. Funds collected may be restricted in replacing existing infrastructure. Given the historical growth rate of approximately 2% for residential development it is not likely that such charges would provide a significant source of funding.

5.1.6.3 Debt Strategy

The Township has leveraged capital expenditures with debt financing to maximize Federal and Provincial grant opportunities. Current debt includes funding for water and sewer infrastructure, municipal buildings and equipment.

5.1.6.4 Government Grants

The costs to maintain the road system cannot be sustained solely on taxation. The institution of the Federal Gas Tax Funding has provided the Township with a sustainable source of infrastructure fund. The Township will need to rely on government infrastructure funding to maintain the road system. The financial model illustrates the potential shortfall and the necessity for the prioritization of projects to optimize infrastructure funding as it becomes available.

5.1.7 *Conclusion*

It is imperative the Township be ready to move forward with specific detailed project requirements in order to satisfy the terms and conditions of possible funding opportunities.

This asset management plan is a foundation block for the implementation of an ongoing strategy to address emerging municipal infrastructure needs. Productive discussion regarding permanent funding solutions will be enhanced by the continued review and updating of the current model.

5.2 WATER AND SEWER INFRASTRUCTURE

5.2.1 *Economic Environment*

The Township undertook significant investment in the water and sewer infrastructure between 2002 and 2005. The Provincial and Federal governments provided funding of $10 million. The municipal cost of the rehabilitation was funded by a local improvement charge. Consumers had the option of paying the amount in full or financing the amount over a 10 or 30 year term.

As water and sewer services are provided to various settled areas within the Township, the rates are calculated by service area and type of use. Water services range between $169 per year per connection to $532 per year. Sewer services, which are provided in Long Sault and Ingleside, are approximately $375 per year per connection.

Properties that were invoiced for local improvement charges upon completion of the capital project had the option to pay the invoice in full or debenture the payment over a number of years. Annual debt charges range between $18 and $1,221 per household.

The rate structure provides for annual contributions to reserves.

This “user based” source of financing supports the principle of allocating infrastructure costs to those who benefit directly from it, a financial strategy recommended in the current provincial “Guide for Municipal Asset Management Plans”.

The attached financial models (Appendix E, Tables E.4-E.5) explore a long-range plan for maintaining the most cost-effective approach for delivering services at acceptable levels, assuming the lowest risk possible. A proactive approach including condition assessment studies will provide meaningful management information for decision making. In this manner, repair and replacement work can be assessed and completed on a timely basis to avoid the possibility of system failure.

Table E.5 sets out the capital expenditures by department over a 10-year period. Table E.4 includes the capital expenditures identified in Table E.5 and the funding sources available. Funding sources include funds from reserves, proceeds of long-term debt and government grants. As long-term debt creates an obligation on future revenues, its repayment is considered a commitment of future resources. The annual funding shortfall is calculated as the difference between required expenditures and the available sources of funding.

The continuity of reserves presented in Table E.4 is included to add clarification regarding funding sources available. The financial plan includes funds allocated for capital projects to accumulate within the reserve. As funds are required for capital expenditures and debt repayment, they are withdrawn from the reserve.

The 10-year time frame does not assess the life cycle costing of the water and sewer infrastructure. Life cycle costing involves projecting the future replacement costs (estimating inflation) and then calculating an annual investment to meet that future expenditure.

5.2.2 *Assumptions*

The assumptions, both general and specific, for the financial models are included in Table 41:

TABLE 41 – ASSUMPTIONS FOR THE FINANCIAL MODEL

Risk Factors	Considerations
Interest Rate	Debt repayment on existing debt is based on the fixed rate associated with the debt. Annual updates to this plan, which is a "living" document would include a review of the borrowing rates. Interest on reserves has been calculated at 2% (prime less 1%).
Inflation	No inflation factor has been included in the model for Years 2014-2015 as costs are broad estimates and could be incurred within as short a time frame as three years. For midrange expenditures (three to 10-year period), inflation has been estimated at 4% per year based on simple interest. The risk for costs estimates increases in longer term projections.
Discounting to Present Value	The future value of replacement costs are calculated at 4% compounding inflation rate. The risk in the inflation estimate is the potential for increased service standards and the inflation indices for construction outpacing standard inflation. To determine the present value investment of funds, required interest rates are estimated at 2%.
Allocation to Reserves	The annual allocation is based on an estimate of historical information. Annual increases are an estimate of inflation and growth. Interest income is allocated to reserves based on the opening reserve balance.
Capitalization Threshold	Generally, preventative maintenance activities are not considered capital and are not included in the long term capital plan.
Disposals	Disposals do not provide for any significant source of funding as the equipment would be obsolete at the time of replacement. The costs to remove infrastructure are included in the reconstruction costs. Existing facilities will be rehabilitated.

5.2.3 *Funding Requirements*

The majority of the water and sewer infrastructure system is in the early years of its life cycle.

For the 10-year timeframe, the rate structure will fund the capital expenditures.

It will not fund the life-cycle costing for the rehabilitation of the infrastructure.

The following table sets out the current replacement cost, the estimated timeframe for replacement, the future value of the replacement and the annual contribution to fund the future replacement.

TABLE 42 – REPLACEMENT COST, TIMEFRAME, FUTURE VALUE AND ANNUAL CONTRIBUTION FOR ASSET REPLACEMENT

Infrastructure	Current Replacement Cost (millions)	Timeframe for Replacement	Future Value of Replacement (millions)	Annual Contribution Required (millions)
Water Plants	$ 16.50	50 years	121.5	$ 1.384
Sewage Plants	$ 31.30	50 years	230.8	$ 2.630
Water Mains	$ 15.75	25 years	42.74	$ 1.265
Water Mains	$ 15.75	50 years	115.99	$ 1.322
Sewer Mains	$ 12.20	50 years	89.88	$ 1.025
Total	**$ 91.50**		**$ 600.91**	**$ 7.626**

5.2.4 *Sources of Funding*

5.2.4.1 Development Charges

The Township may consider the implementation of development charges which are intended to fund infrastructure related to new growth. Funds collected may be restricted in replacing current infrastructure. Given the historical growth rate of approximately 2% for residential development it is not likely that such charges would provide a significant source of funding.

5.2.4.2 User Charges

User charges will fund contributions to reserves and debt repayment, both of which are an integral part of the financial plan. Based on the current service connections of 2565, an annual contribution of $2,973 per connection would be required to fund life-cycle costing.

5.2.4.3 Government Grants

The costs to replace the system cannot be sustained solely on user charges. The Township will need to rely on government infrastructure funding to replace the system. The financial model illustrates the potential shortfall and the necessity for the prioritization of projects to optimize infrastructure funding as it becomes available.

5.2.5 *Conclusion*

It is imperative the Township be ready to move forward with specific detailed project requirements in order to satisfy the terms and conditions of possible funding opportunities.

This asset management plan is a foundation block for the implementation of an ongoing strategy to address emerging municipal infrastructure needs. Productive discussion regarding permanent funding solutions will be enhanced by the continued review and updating of the current model.

APPENDIX A

ASSET INVENTORY AND REPLACEMENT COST VALUATION

TABLE A.1 – INVENTORY AND REPLACEMENT COST VALUATION – GRAVEL ROADS (RURAL AND SEMI-URBAN)

No.	STREET	FROM	TO	Km	BOUND RD.	ENVIR	TYPE	PLAT. WIDTH	SURF WIDTH	R.O.W. WIDTH	SCHOOL BUS ROUTE	TRAFFIC RANGE	CONDITION RATING IN 2011	REPLACEMENT COST VALUATION
005	Delaney Road	County Road 18	Island Road	1.10	N	R	G	7	20	6	N	50-199	7.00	$ 429,000
007	Willy Bill Road	North Branch Road	Froats Road	4.80	N	R	G	6.5	16		Y		6.00	$ 1,872,000
008	Froats Road	Willy Bill Road	Dead End	0.90	Y	R	G	5	12		N	0-49	6.00	$ 351,000
009	Pineridge Road	South Glengarry Boundary	Willy Bill Road	0.40	N	R	G	7	12		N		6.00	$ 156,000
010	Bingley Road	Willy Bill Road	Dead End	1.50	N	R	G	6.5	16		N	0-49	6.00	$ 585,000
014	Beagle Club Road	McPhail Road	Dead End	0.40	N	R	G	7	16			0-49	6.00	$ 156,000
016A	Guindon	Highway 138	0.3km south of Hwy 138	0.30	N	R	G	7		5		0-49	4.00	$ 117,000
018	Archambault Road	Highway 138	Dead End	1.00	N	R	G	6.5	12		Y	0-49	5.00	$ 390,000
019	DeWit Road	County Road 18	Dead End	0.50	N	R	G	4.5	12		N	0-49	3.00	$ 195,000
025	Charles Road	County Road 44	Dead End	0.25	N	R	G	8			N	0-49	7.00	$ 97,500
027	Poirier Avenue	Cornwall Centre Road	Dead End	0.10	N	S	G	16	20	16	N	0-49	7.00	$ 39,000
028	Julien Street	Cornwall Centre Road	Dead End	0.10	N	R	G	7			N	0-49	5.00	$ 39,000
030	Barlow Road	County Road 33	Dead End	0.60	N	R	G	7			N	0-49	6.00	$ 234,000
031	Headline Road	County Road 33	Dead End	0.10	N	S	G	7	20		N	0-49	7.00	$ 39,000
040A	Pidgeon	Richmond Road	Dead End	0.20	N	R	G	7	20	5	N	0-49	5.00	$ 78,000
042	Richmond Road	Lafarge Quarry Road	County Road 36	1.50	N	R	G	8	20		Y		6.00	$ 585,000
043	Quail Road	Highway 138	Dead End	2.60	Y	R	G	7	16		Y	0-49	3.00	$ 1,014,000
046	Willy Allan Road	3.5km west of Hwy 138	County Road 15	5.40	N	R	G	8	20		Y	50-199	7.00	$ 2,106,000
047	Cornwall-Roxborough Bo	County Road 15	Dead End	2.10	Y	R	G	6.5	20		Y	0-49	6.00	$ 819,000
048	Cornwall-Roxborough Bo	County Road 15	Dead End	1.30	Y	R	G	6.5	12		Y	0-49	6.00	$ 507,000
050	Brunet Road	Black River Road	Dead End	2.10	N	R	G	7	20		Y	0-49	6.00	$ 819,000
052	Lawson Road	Maloney Road	Myers Road	2.30	N	R	G	7.5	16		Y	50-199	6.00	$ 897,000
053	McGillis Road	Myers Road	Willy Allan Road	1.80	N	R	G	8			Y	50-199	7.00	$ 702,000
054	Allinotte Road	Willy Allan Road	Dead End	0.30	N	R	G	6	20		Y	0-49	7.00	$ 117,000
055	Campeau Road	Willy Allan Road	Dead End	0.30	N	R	G	7.5	20		N	0-49	7.00	$ 117,000
057	O'Keefe Road	Maloney Road	Valade Road	1.35	N	R	G	5.5	20		N		2.00	$ 526,500
064	Barcier Lane	Myers Road	Dead End	0.30	N	S	G	6	20		N	0-49	7.00	$ 117,000
066	Chisholm Road	County Road 18	County Road 36	0.95	N	R	G	7.5	20		Y		7.00	$ 370,500
067	Losey Road	Windfall Road	County Road 29	1.20	N	R	G	7.5			Y		6.00	$ 468,000
069	Northfield Road	County Road 18	Dixon Road	4.60	N	R	G	7.5	20	6	Y	400-999	7.00	$ 1,794,000
070	Central Road	Northfield Road	Dead End (Laneway)	0.10	N	R	G	6	20		N	0-49	4.00	$ 39,000
071	Cleary Road	Northfield Road	Dead End	0.25	N	R	G	6.5	20		N	0-49	6.00	$ 97,500
072	Eamer Road	Northfield Road	1.6km east of Northfield	1.60	N	R	G	8	20		Y		7.00	$ 624,000
076	Dixon Road	Northfield Road	MacRae Road	0.65	N	R	G	8	20		Y		7.00	$ 253,500
079	Stata Road	Dixon Road	North Lunenburg Road East	2.10	N	R	G	8	20		Y		7.00	$ 819,000
081	MacRae Road	Dixon Road	Hoople Seventh Road	1.80	N	R	G	7.5			Y		7.00	$ 702,000
082	Hoople Seventh Road	MacRae Road	County Road 12	2.70	N	R	G	7.5	20		Y		7.00	$ 1,053,000
083	Helmer Road	Hoople Seventh Road	Dead End (Laneway)	0.50	N	R	G	6			N	0-49	3.00	$ 195,000
084	Helmer Road	Hoople Seventh Road	County Road 14	2.20	N	R	G	7.5			Y		6.00	$ 858,000
086	Saving Street	2.3km east of County Road 14	North Stormont Boundary	0.40	N	R	G	7	20	6	Y		6.00	$ 156,000
090	Dafoe Road	Aultsville Road	Mel's Lane	1.90	N	R	G	7			Y	0-49	7.00	$ 741,000
091	Mel's Lane	Dafoe Road	Edge of South Dundas Boundary	0.20	N	R	G	5.5			Y	0-49	Maintained by South	N/A
092	Haystead Road	South Dundas Boundary	Groves Road	0.20	N	R	G	6.5			Y			
093	Groves Road	Haystead Road	County Road 18	1.10	N	R	G	6.5			Y		7.00	$ 429,000
094	Edwards Road	County Road 18	County Road 11	2.50	N	R	G	7			Y		7.00	$ 975,000
095	Pleasant Valley Road	County Road 11	Rombough Road	2.30	N	R	G	8			Y		7.00	$ 897,000
099	Hollister Road	County Road 14	Elijh/Beckstead Road	0.70	N	R	G	6.5			N	0-49	6.00	$ 273,000
102B	Bruning Road	0.4km north of Elijh/Beckstead Road	Hart Road	1.80	N	R	G	6.5			Y		7.00	$ 702,000
103	Gravel Pit Road	Eaman Road	County Road 18	1.75	N	R	G	8			Y		7.00	$ 682,500
107	Hart Road	North Valley Road	Bush Glen Road	2.10	N	R	G	7.5			Y		7.00	$ 819,000
108	Collins Road	Bush Glen Road	County Road 11	2.80	N	R	G	5.5			Y		5.00	$ 1,092,000
109A	Bush Glen Road	County Road 11	0.4km west of Hart Road	4.20	N	R	G	7			Y		7.00	$ 1,638,000
112	Froats Road	County Road 14	Dead End	0.15	N	R	G	6			N	0-49	5.00	$ 58,500
114	Trillium Road	May Road	Landfill Site (Dead End)	0.90	N	R	G	6			N	0-49	5.00	$ 351,000
116	Goldfield Road	Hunters Road	Edge of North Stormont Boundary	0.55	N	R	G	7			Y		7.00	$ 214,500
117	Wittenveen Road	Hunter Road	Edge of North Stormont Boundary	0.80	N	R	G	7			Y		7.00	$ 312,000
118A	Allen Road	County Road 11	Lalonde Road	1.10	N	R	G	6			N	0-49	6.00	$ 429,000
121	Mary's Road	County Road 11	County Road 18	3.40	N	R	G	6.5			N		6.00	$ 1,326,000
122	Whipperwill Lane	Mary's Road	The edge of South Dundas Boundary	0.50	N	R	G				Y		6.00	$ 195,000
125	Bunker Hill Road	County Road 14	Dead End (Laneway)	0.10	N	R	G	5			N		5.00	$ 39,000
126	Cooper Road	North Lunenburg Road West	2.4km north of North Lunenburg Road	2.40	N	R	G	7.5			Y	0-49	7.00	$ 936,000
128	Moak Road	County Road 12	Dead End	0.40	N	R	G	6.5			N		6.00	$ 156,000
129	Raymond Road	County Road 12	Zeran Road	2.00	N	R	G	6.5			Y		6.00	$ 780,000
130	Zeran Road	County Road 14	County Road 12	3.90	N	R	G	6.5			Y		6.00	$ 1,521,000
131	Forestry Road	County Road 12	County Road 12	0.60	N	R	G	6			Y	0-49	5.00	$ 234,000
132	Smith Road	County Road 12	Waldroff Road	2.00	N	R	G	6.5			N		6.00	$ 780,000
133A	Finch-Osnabruck Bounda	County Road 12	Dead End (west)	2.00	N	R	G	6.5			Y	0-49	5.00	$ 780,000
133B	Finch-Osnabruck Bounda	County Road 12	Dead End (east)	0.40	Y	R	G	6			Y	0-49	6.00	$ 156,000
134A	Waldroff Road	County Road 12	County Road 12	3.60	N	R	G	6.8			Y		6.00	$ 1,404,000
135A	Finch-Osnabruck Bounda	Dead End	St. Luke's Road	1.00	Y	R	G	6			Y	0-49	4.00	$ 390,000
135B	Finch-Osnabruck Bounda	St. Luke's Road	County Road 14	0.70	Y	R	G	8			Y	0-49	7.00	$ 273,000
150	Farron's Point Road	North End of Section 149	1.3 km North of County Road 2	1.00	N	R	G	7			Y	0-49	6.00	$ 390,000
151	Farron's Point Road	1.3 km North of County Road 2	Dead End (@ CNR Line)	0.30	N	R	G	6			N	0-49	4.00	$ 117,000
187	Woodlands Road	0.2m north of Santa Cruz	Dead End	0.80	N	R	G	8		6	N	0-49	6.00	$ 312,000
200	McNiff Avenue	County Road 35	Dead End	0.10	N	R	G	9		9	N	0-49	7.00	$ 39,000
215	Lakeside Drive	Moulinette Island Causeway	Moulinette Island Causeway	2.00	N	R	G	7.5			N		5.00	$ 780,000
216	East Island Causeway	Lakeside Drive	Dead End	0.50	N	R	G	7.5			N	0-49	5.00	$ 195,000
222	Fran Lafran Drive	County Road 2	County Road 2	0.40	N	R	G	8			N		6.00	$ 156,000
229	Prieur Road	County Road 15	Dead End	0.10	N	R	G	7		6		0-49	6.00	$ 39,000
-	Heather Crescent	County Road 18	Dead End	0.30	N	R	G	7	20	6	N		7.00	$ 117,000
WEIGHTED AVERAGE CONDITION RATING FOR GRAVEL ROADS													**6.16**	
TOTAL				**105.80**										**$ 41,262,000**

TABLE A.2 – INVENTORY AND REPLACEMENT COST VALUATION – SURFACE TREATED ROADS (RURAL)

No.	STREET	FROM	TO	Km	BOUND RD.	ENVIR	TYPE	PLAT. WIDTH	SURF WIDTH	R.O.W. WIDTH	SCHOOL BUS ROUTE	TRAFFIC RANGE	CONDITION RATING IN 2011	REPLACEMENT COST VALUATION
003	Island Road	0.1km west of Delaney Road	Delaney Road	0.10	N	R	LCB	7	20	6	Y		8.50	$ 44,800
004	Island Road	Delaney Road	Edge of South Glengarry Boundary	2.20	N	R	LCB	7	20		Y		5.50	$ 985,600
006	Delaney Road	Island Road	North Branch Road	2.20	N	R	LCB	7.5	20	6	Y	50-199	8.00	$ 985,600
011	North Branch Road	South Glengarry Boundary	Delaney Road	1.80	N	R	LCB	7.5	20	6	Y		4.00	$ 806,400
013	McPhail Road	0.4km west of Delaney Road	2.8km west of Delaney Road	2.40	N	R	LCB	8	20	6	Y		4.00	$ 1,075,200
016C	Cameron Road	Highway 138	Dead End	2.40	N	R	LCB	8.5	20		Y	0-49	5.00	$ 1,075,200
017	Amell Road	Highway 138	Dead End	1.90	Y	R	LCB	8	20		Y	0-49	6.50	$ 851,200
040B	Atchenson Road	Richmond Drive	1.35km East of Richmond Drive	1.35	N	R	LCB	8.4	20	6.4	y	50-199	7.00	$ 604,800
040C	Atchison Road	1.35km east of Richmond Drive	County Road 33	1.55	N	R	LCB	8.4	20	6.4	Y	50-199	6.00	$ 694,400
044	MacMillan Corners Road	Highway 138	Edge of North Stormont Boundary	0.90	Y	R	LCB	7.5		6	Y		6.00	$ 403,200
065	Valade Road	Highway #138	County Road 18	3.10	N	R	LCB	7.5	20	6	Y		9.00	$ 1,388,800
068A	Windfall Road	County Road 35	2.5km northerly	2.50	N	R	LCB	7.5	20	6	Y		6.00	$ 1,120,000
068B	Windfall Road	2.5km north of County Road 35	County Road 18	0.90	N	R	LCB	7.5	20	6	Y		6.00	$ 403,200
073	Eamer Road	1.6km east of North Field Road	County Road 15	1.40	N	R	LCB	8	20		Y		6.00	$ 627,200
074A	Northfield Road	Dixon Road	2.1km west of County Road 15	1.20	N	R	LCB	7	20	6	Y	200-399	6.50	$ 537,600
074B	Northfield Road	2.1km west of County Road 15	County Road 15	2.10	N	R	LCB	7	20	6	Y	200-399	7.00	$ 940,800
080	North Lunenburg Road E	County Road 12	Northfield Road	1.90	N	R	LCB	7	20	6	Y	400-999	3.50	$ 851,200
087	Eaman Street	County Road 12	1.7km west of County Road 12	1.70	N	R	LCB	7	20	6	Y		9.00	$ 761,600
088	Eaman Road	1.7km west of County Road 12	County Road 14	3.50	N	R	LCB	7		6	Y		3.50	$ 1,568,000
097	Rombough Road	Pleasant Valley Road	Elijh/Beckstead Road	2.30	N	R	LCB	7.5		6	Y		3.00	$ 1,030,400
098	Neville Road	Rombough Road	County Road 14	2.00	N	R	LCB	8		6	Y	50-199	8.00	$ 896,000
100	Elijh/Beckstead Road	County Road 14	3.5 km West of County Road 14	3.50	N	R	LCB	7.5		6	Y		3.00	$ 1,568,000
101	Elijh/Beckstead Road	3.5 km West of County Road 14	County Road 11	0.90	N	R	LCB	6.5			Y		6.00	$ 403,200
102A	Bruning Road	Elijh/Beckstead Road	0.4km North	0.40	N	R	LCB	7			Y		6.50	$ 179,200
104	Duffy's Road	County Road 14	Morgan Road	1.20	N	R	LCB	7.5		6	Y		3.50	$ 537,600
105B	Morgan Road	Duffy's Road	Dafoe Road	2.00	N	R	LCB	7.5		6	Y		6.00	$ 896,000
106	North Valley Road	Otto Road	Elijh/Beckstead Road	2.80	N	R	LCB	7.5		6	Y		3.00	$ 1,254,400
110B	May Road	0.70 km south of Hunters Road	Trillium Road	1.30	N	R	LCB				Y		3.50	$ 582,400
110C	May Road	Trillium Road	Bush Glen Road	1.50	N	R	LCB				Y		7.00	$ 672,000
111A	Sandtown Road	County Road 12	1.5km west of County Road 12	1.50	N	R	LCB	7		6	Y	50-199	6.50	$ 672,000
111B	Sandtown Road	1.5km west of County Road 12	May Road	1.90	N	R	LCB	7		6	Y	50-199	6.00	$ 851,200
113	Otto Road	County Road 14	May Road	3.20	N	R	LCB	7.5		6	Y		3.00	$ 1,433,600
115	Hunters Road	County Road 12	County Road 11	7.80	N	R	LCB	7.5		6	Y		5.00	$ 3,494,400
123A	Aultsville Road	County Road 18	1.0km south of County Road 18	1.00	N	R	LCB	9		9	Y		5.00	$ 448,000
124A	North Lunenburg Road W	0.8km east of County Road 14	0.9km west of County Road 12	4.40	N	R	LCB	7.5		6	Y	200-399	8.00	$ 1,971,200
WEIGHTED AVERAGE CONDITION RATING FOR LOW CLASS BITUMINOUS SURFACE													**5.50**	
TOTAL KILOMETRES				**72.80**										**$ 32,614,400**

TABLE A.3 – INVENTORY AND REPLACEMENT COST VALUATION – ASPHALT ROADS (RURAL)

No.	STREET	FROM	TO	Km	BOUND RD.	ENVIR	TYPE	PLAT. WIDTH	SURF WIDTH	R.O.W. WIDTH	SCHOOL BUS ROUTE	TRAFFIC RANGE	CONDITION RATING IN 2011	REPLACEMENT COST VALUATION
001	Island Road	Highway 138	0.1km west of Delaney Road	4.40	N	R	HCB	7	20	6	Y		8.50	$ 2,503,600
002	Lefebvre Road	Island Road	County Road 18	0.10	N	R	HCB	7	20	6	Y		3.00	$ 56,900
012	McPhail Road	Delaney Road	0.4km west of Delaney Road	0.40	N	R	HCB	8	20	6	Y		5.75	$ 227,600
015	McPhail Road	2.8km west of Delaney Road	Highway 138	1.80	N	R	HCB		20	6	Y		9.00	$ 1,024,200
016B	Guindon	0.3km south of Hwy 138	Highway 138	0.20	N	R	HCB			5		0-49	2.00	$ 113,800
020	Willis Street	County Road 18	Haughton Street	0.10	N	R	HCB	7	20	6	Y	0-49	5.75	$ 56,900
021	Haughton Street	Willis Street	Dead End	0.20	N	R	HCB	7.5	20	6	Y	0-49	5.50	$ 113,800
022	Carleton Street	Highway 138	Dead End	0.15	N	R	HCB	7	20	6	Y	0-49	5.75	$ 85,350
023	Fraser Street	County Road 18	Dead End	0.30	N	R	HCB	7	20	6	Y	0-49	5.00	$ 170,700
024	McIntosh Road	County Road 18	Dead End	0.20	N	R	HCB	7	20	6	N	0-49	5.00	$ 113,800
026	Dow Street	Highway 138	Dead End	0.25	N	R	HCB	10	20	6	Y	0-49	6.50	$ 142,250
029	Speer Road	Cornwall Centre Road	Dead End	0.90	N	R	HCB	8	20	6	Y	0-49	6.60	$ 512,100
045	Willy Allan Road	Highway 138	3.5km west of Hwy 138	3.50	N	R	HCB	8	20	6	Y	50-199	6.00	$ 1,991,500
049	Black River Road	County Road 15	County Road 18	2.85	N	R	HCB	8	20	6.2	Y		6.00	$ 1,621,650
051	McClave Road	County Road 18	Maloney Road	0.20	N	R	HCB	8	20	6	Y		6.50	$ 113,800
056	O'Keefe Road	Myers Road	Wheeler Road	1.85	N	R	HCB	8	20	6	Y		6.00	$ 1,052,650
058	Wheeler Road	Highway 138	O'Keefe Road	1.60	N	R	HCB	7.5	20	6	Y		5.00	$ 910,400
059	Maloney Road	O'Keefe Road	County Road 18	3.20	N	R	HCB	7.5	20	6	Y		4.75	$ 1,820,800
060	Myers Road	County Road 15	4.0km east of County Road 15	4.00	N	R	HCB	7.5	20	6	Y	400-999	4.75	$ 2,276,000
061	Myers Road	4.0km east of County Road 15	O'Keefe Road	2.10	N	R	HCB	6.5	20	6	Y	400-999	8.00	$ 1,194,900
062A	Myers Road	O'Keefe Road	1.0km east of O'Keefe Road	1.00	N	R	HCB	7	20	6	Y	0-49	4.50	$ 569,000
062B	Myers Road	1.0km east of O'Keefe Road	Highway 138	0.70	N	R	HCB	7	20	6	Y	0-49	7.50	$ 398,300
063	Cornett Lane	Myers Road	Dead End	0.40	N	R	HCB	8	20	6	Y	0-49	2.75	$ 227,600
077	Dixon Road	MacRae Road	County Road 12	2.80	N	R	HCB	7.5	20	6	Y		5.00	$ 1,593,200
078	Bilmer Road	Dixon Road	Dead End	0.10	N	R	HCB	8		6	N	0-49	2.00	$ 56,900
085	Saving Street	County Road 14	2.3km east of County Road 14	2.30	N	R	HCB	6.5	20	6	Y		4.00	$ 1,308,700
089A	Dafoe Road	Aultsville Road	1.2km east of Aultsville Road	1.20	N	R	HCB	7	20	6	Y		8.50	$ 682,800
089B	Dafoe Road	1.2km east of Aultsville Road	2.1km west of County Road 14	3.10	N	R	HCB	7	20	6	Y		6.00	$ 1,763,900
089C	Dafoe Road	County Road 14	2.1km west of County Road 14	2.10	N	R	HCB	7	20	6	Y		5.00	$ 1,194,900
096A	Rombough Road	County Road 18	Pleasant Valley Road	1.10	N	R	HCB	7.5		6	Y		6.00	$ 625,900
105A	Morgan Road	County Road 18	Duffy's Road	0.30	N	R	HCB	7.5		6	Y		5.50	$ 170,700
109B	Bush Glen Road	0.4km west of Hart Road	Hart Road	0.40	N	R	HCB	7			Y		3.00	$ 227,600
110A	May Road	Hunters Road	0.70 km South of Hunters Road	0.70	N	R	HCB				Y		7.00	$ 398,300
123B	Aultsville Road	County Road 2	1.6km north of County Road 2	1.60	N	R	HCB	9		9	Y		8.00	$ 910,400
123C	Aultsville Road	1.6km north of County Road 2	1.0km south of County Road 18	2.30	N	R	HCB	9		9	Y		9.00	$ 1,308,700
124B	N. Lunenburg Road, Wes	0.9km west of County Road 12	County Road 12	0.90	N	R	HCB	7.5		6	Y	200-399	5.50	$ 512,100
124C	North Lunenburg Road W	County Road 14	0.8km east of County Road 14	0.80	N	R	HCB	7.5		6	Y	200-399	5.50	$ 455,200
127	Cooper Road	County Road 12	2.0km west of County Road 12	2.00	N	R	HCB	7.5		6	Y		3.00	$ 1,138,000
136	Fairground Drive	County Road 14	Elm Street	0.20	N	R	HCB	8		6	N	0-49	3.75	$ 113,800
137	Elm Street	Fairground Drive	County Road 14	0.40	N	R	HCB	8		6	N	0-49	3.75	$ 227,600
138	Ash Street	County Road 14	Fairground Drive	0.40	N	R	HCB	8		6	N	0-49	3.75	$ 227,600
139	Mill Street	Elm Street	County Road 14	0.20	N	R	HCB	8		6	N	0-49	2.75	$ 113,800
140	Duval Street	County Road 14	Ash Street	0.10	N	R	HCB	8		6	N	0-49	2.75	$ 56,900
141	Loyalist Crescent	County Road 12	County Road 12	0.70	N	R	HCB	8	20	6	Y	0-49	6.00	$ 398,300
142	Bayview Road	County Road 2	Manning Road	0.10	N	R	HCB	7		6	Y	0-49	8.00	$ 56,900
143	Windermere Drive	Manning Road	Dead End	0.35	N	R	HCB	8		6	Y	0-49	4.50	$ 199,150
144	Manning Road	Dead End	County Road 12	0.90	N	R	HCB				Y	0-49	7.00	$ 512,100
145	Stuart Road	Manning Road	Dead End	0.10	N	R	HCB	8		6	N		3.00	$ 56,900
148	Colonial Drive	Dead End (East End)	County Road 2	2.70	N	R	HCB	7.5		6	Y	50-199	7.50	$ 1,536,300
149	Farron's Point Road	County Road 2	0.3 km North	0.30	N	R	HCB	7.5		6	Y		7.50	$ 170,700
152	Anderson Road	Farron's Point Road	Aultsville Road	3.50	N	R	HCB	7		6	Y		3.00	$ 1,991,500
153	Anderson Road	Aultsville Road	Edge of South Dundas Boundary	1.80	N	R	HCB	7		6	Y		2.75	$ 1,024,200
154	Anderson Road	Edge of South Dundas Boundary	Nudell Bush Road	0.20	N	R	HCB	7		6	Y		2.75	$ 113,800
155	Ault Island Road	County Road 2	Willbruck Drive	1.80	N	R	HCB	8		6	Y		5.50	$ 1,024,200
156	Willbruck Drive	Ault Island Road	Dead End	1.80	N	R	HCB	8		6	Y		4.50	$ 1,024,200
157	McLeod Road	County Road 2	Dead End	0.20	N	R	HCB	6		4	N	0-49	2.75	$ 113,800
169	Shaver Road	Colonial Road	0.7 km North	0.70	N	R	HCB	7.5		7	N	0-49	2.00	$ 398,300
182	Railway Street	Industrial Drive	Dead End	0.30	N	R	HCB	7.5		6	N	0-49	3.00	$ 170,700
214	Moulinette Island Causev	Long Sault Parkway	Lakeside Drive	1.20	N	R	HCB			6	N	200-399	6.00	$ 682,800
219	Structured Products Driv	County Road 2	Dead End	0.20	N	R	HCB	9		7	N		7.75	$ 113,800
220	Six Smith Drive	County Road 2	Dead End	0.40	N	R	HCB	8		6	N	0-49	7.00	$ 227,600
221	Warner Drive	Six Smith Drive	Dead End	0.45	N	R	HCB	7.3		6	N	0-49	6.75	$ 256,050
227	Moss Drive	County Road 15	Jenkins Road	0.35	N	R	HCB	7		6	N	0-49	5.75	$ 199,150
WEIGHTED AVERAGE CONDITION RATING FOR HIGH CLASS BITUMINOUS SURFACE (R)													5.73	
TOTAL KILOMETRES				71.45										$ 40,655,050

TABLE A.4 – INVENTORY AND REPLACEMENT COST VALUATION – ASPHALT ROADS (SEMI-URBAN)

No.	STREET	FROM	TO	Km	BOUND RD.	ENVIR	TYPE	PLAT. WIDTH	SURF WIDTH	R.O.W. WIDTH	SCHOOL BUS ROUTE	TRAFFIC RANGE	CONDITION RATING IN 2011	REPLACEMENT COST VALUATION
032	Headline Road	County Road 33	2.5km east of County Road 33	2.50	N	S	HCB	8	20	6	Y	400-999	8.00	$ 2,200,000
033	Headline Road	2.5km east of County Road 33	Highway 138	0.40	N	S	HCB	8	20	6	Y	400-999	6.00	$ 352,000
034	Charlotte Avenue	Headline Road	Dead End	0.25	N	S	HCB	8	20	6	N	0-49	6.50	$ 220,000
035	Cedarview Road	Headline Road	Dead End	0.40	N	S	HCB	8	20	6	Y	0-49	5.00	$ 352,000
036	Marl Road	Cedarview Road	Dead End	0.10	N	S	HCB	8	20	6	N	0-49	6.00	$ 88,000
037	Poplar Avenue	Headline Road	Beaver Dam Road	0.50	N	S	HCB	8	20	6	Y	50-199	4.75	$ 440,000
038	Beaver Dam Road	Poplar Avenue	County Road 33	1.20	N	S	HCB	8	20	6	Y	50-199	5.50	$ 1,056,000
039	Equestrian Road	Beaver Dam Road	Beaver Dam Road	0.50	N	S	HCB	8	20	6	Y	50-199	6.00	$ 440,000
041	Richmond Road	Cornwall City Limits	Lafarge Quarry Road	0.90	N	S	HCB	8	20	6	Y		9.00	$ 792,000
146	Manning Road	County Road 12	County Road 35	2.60	N	S	HCB	8		6	Y	200-399	9.00	$ 2,288,000
147	Vin Vista Drive	County Road 2	Dead End	1.10	N	S	HCB	7.5		6	Y	0-49	7.00	$ 968,000
158	Kilarney Avenue	County Road 2	St. Lawrence Street	0.10	N	S	HCB	8		6	Y		5.75	$ 88,000
159	Piercy Street	St. Lawrence Street	Dead End	0.40	N	S	HCB	10		9.7	N	0-49	7.50	$ 352,000
160	Napier Street	St. Lawrence Street	Dead End	0.20	N	S	HCB	8		6	Y	0-49	5.50	$ 176,000
161	St. Lawrence Street	Dead End @ West End	Dickinson Drive	1.40	N	S	HCB	8		6	Y	200-399	5.75	$ 1,232,000
162	Thorold Lane	Dickinson Drive	Bank Street	0.20	N	S	HCB			6	Y		5.75	$ 176,000
163	Maple Street	Bank Street	Farran Road	0.15	N	S	HCB	8		6	Y		5.75	$ 132,000
164	Maple Street	Farran Drive	Farran Drive	0.65	N	S	HCB	7		6	Y	0-49	2.75	$ 572,000
165	Maple Street	Farran Drive	Dickinson Drive	0.35	N	S	HCB	7		6	Y		5.75	$ 308,000
166	Bank Street	County Road 2	Maple Street	0.30	N	S	HCB	8		6	Y	400-999	5.75	$ 264,000
171	Shaver Road	Colonial Road	County Road 2	0.15	N	S	HCB						5.00	$ 132,000
172	Ault Street	St. Lawrence Street	Hickory Street	0.40	N	S	HCB	9		7		N	8.00	$ 352,000
174A	Pine Street	Ault Street	Ault Street	0.70	N	S	HCB	9		7	N	0-49	4.50	$ 616,000
175	Hickory Street	Piercy Street	Ault Street	0.50	N	S	HCB	9		7	N	0-49	8.00	$ 440,000
176	Hickory Street	Ault Street	Farran Drive	0.70	N	S	HCB	9		7	N		5.50	$ 616,000
177	Spruce Street	Farran Drive	Hickory Street	0.40	N	S	HCB	9		7	N	0-49	3.00	$ 352,000
178	Farran Street	County Road 2	Spruce Street	0.60	N	S	HCB	9		7	N	400-999	7.00	$ 528,000
179	Farran Street	Spruce Street	45th Parallel Drive	0.50	N	S	HCB	9		7		400-999	7.00	$ 440,000
180	College Street	Farran Drive	Dickinson Drive	0.40	N	S	HCB	VARIES		7		400-999	5.75	$ 352,000
181	45th Paralllel Drive	Dickinson Drive	Farran Drive	0.40	N	S	HCB	9		7	N		8.00	$ 352,000
183	Elm Street	Dickinson Drive	Wales Drive	0.50	N	S	HCB	9		7	N		5.75	$ 440,000
184	Hoople Street	Wales Drive	Elm Street	0.45	N	S	HCB	9		7	N	0-49	7.00	$ 396,000
185	Wales Drive	Dead End	County Road 2	0.60	N	S	HCB	9		7	N		5.75	$ 528,000
186	Woodlands Road	Santa Cruz	0.2km North	0.20	N	S	HCB	8		6	N	0-49	7.00	$ 176,000
188	Santa Cruz	Woodlands Road	100m W of Woodlands Road	0.10	N	S	HCB	9		7	N	0-49	5.75	$ 88,000
189	Santa Cruz	100m west of Woodlands Road	Dickinson Drive	0.55	N	S	HCB	9		7			5.00	$ 484,000
190	Maxwell Avenue	Santa Cruz	Wales Drive	0.50	N	S	HCB	9		7	N	0-49	4.75	$ 440,000
191	Dale Street	Manning Road	Moak Street	0.50	N	S	HCB	8		6	N	0-49	5.75	$ 440,000
192	Moak Street	Dale Street	David Street	0.15	N	S	HCB	8		6	N	0-49	6.00	$ 132,000
193	David Street	Moak Street	Manning Road	0.50	N	S	HCB	8		6	N	0-49	7.00	$ 440,000
194	Brown Street	Dale Street	David Street	0.15	N	S	HCB	8		6	N	0-49	7.00	$ 132,000
195	Simcoe Street	County Road 35	Mille Roches Road	0.50	N	S	HCB	9		7	N		7.00	$ 440,000
197	Mille Roches Road	Cherry Street	County Road 36	0.70	N	S	HCB	8		6	N		4.50	$ 616,000
199	French Avenue	Cherry Street	County Road 35	0.40	N	S	HCB	9		7	N		7.00	$ 352,000
201	Ouellette Avenue	County Road 35	French Avenue	0.40	N	S	HCB			7	N	0-49	5.50	$ 352,000
202	Strachan Avenue	County Road 36	St. Laurent Avenue	0.30	N	S	HCB	9		7	N		5.50	$ 264,000
203	St. Laurent Avenue	Saunders Avenue	County Road 35	0.40	N	S	HCB	9		7			5.50	$ 352,000
204	Johnson Crescent	County Road 35	County Road 35	0.50	N	S	HCB	9		7	N	50-199	5.75	$ 440,000
205	Gray Avenue	County Road 35	Johnson Crescent	0.20	N	S	HCB	9		7	N	0-49	5.75	$ 176,000
206	Saunders Avenue	Strachan Avenue	Frost Avenue	0.75	N	S	HCB	9		7	N		7.50	$ 660,000
207	Frost Avenue	Strachan Avenue	Mille Roche Road	0.50	N	S	HCB	9		7	N		7.50	$ 440,000
208A	Plaza Street	County Road 35	Long Sault Drive	0.10	N	S	HCB			7	N		8.00	$ 88,000
208B	Long Sault Drive	Plaza Street	County Road 2	0.20	N	S	HCB			7	N		8.00	$ 176,000
209	Plaza Street	Long Sault Drive	Simcoe Street	0.10	N	S	HCB	9		7	N		2.75	$ 88,000
210	Bethune Avenue	Mille Roche Road	Mille Roche Road	0.65	N	S	HCB	9		7	N		8.00	$ 572,000
211	Kent Crescent	Bethune Avenue	Bethune Avenue	0.45	N	S	HCB	9		7	N	0-49	5.75	$ 396,000
212	Dixon Avenue	Bethune Avenue	Kent Crescent	0.10	N	S	HCB	9		7	N	0-49	5.50	$ 88,000
213	Robin Road	County Road 2	Dead End	0.20	N	S	HCB	8		6	N	0-49	5.75	$ 176,000
217	Fickes Road	County Road 2	Dead End	0.40	N	S	HCB	9		7	N	0-49	7.00	$ 352,000
218	Chantine Drive	Dead End West	Dead End East	0.60	N	S	HCB	9		7	N	0-49	3.00	$ 528,000
223	Algonquin Drive	County Road 2	Dead End	0.40	N	S	HCB	7		6	N	0-49	6.00	$ 352,000
224	Saskatchewan Drive	Alonquin Avenue	Columbia Avenue	0.15	N	S	HCB	7		6	N	0-49	5.00	$ 132,000
225	Columbia Avenue	Dead End, East	Thompson Drive	0.60	N	S	HCB	7		6	N	0-49	6.50	$ 528,000
226	Thompson Drive	Dead End	County Road 15	0.20	N	S	HCB	7		6	N	0-49	5.75	$ 176,000
228	Jenkins Road	Dead End	County Road 15	0.30	N	S	HCB	7		6	N	0-49	6.00	$ 264,000
230	Mack Street	Cornwall Center Road	Alguire Street	0.40	N	S	HCB	8		6			4.75	$ 352,000
231	Alguire Street	Mack Street	Melba Street	0.50	N	S	HCB	8		6		0-49	4.75	$ 440,000
232	Melba Street	Alguire Street	Marydale Avenue	0.25	N	S	HCB	8		6		0-49	5.50	$ 220,000
233	Sunnyview Avenue	Melba Street	Mack Street	0.50	N	S	HCB	8		6		0-49	5.50	$ 440,000
234	Virgina Street	Sunnyview Avenue	Dead End	0.20	N	S	HCB	8		6		0-49	5.50	$ 176,000
235	St. James Street	Sunnyview Avenue	Dead End	0.20	N	S	HCB	8		6		0-49	5.50	$ 176,000
236	Crystal Street	Sunnyview Avenue	Alguire Street	0.15	N	S	HCB	8		6		0-49	5.50	$ 132,000
237	Marydale Avenue	Dead End	Joseph Street	1.30	N	S	HCB	8		6			5.50	$ 1,144,000
238	Joseph Street	Marydale Avenue	Philip Street	0.30	N	S	HCB	8		6		0-49	5.50	$ 264,000
239	Philip Street	Dead End	Marydale Avenue	0.15	N	S	HCB	8		6		0-49	5.50	$ 132,000
240	Yolanda Street	Marydale Avenue	Dead End	0.35	N	S	HCB	8		6		0-49	5.50	$ 308,000
241	Daisy Street	Marydale Avenue	Rosedale Avenue	0.30	N	S	HCB	8		6		0-49	5.50	$ 264,000
242	Rosedale Avenue	Daisy Street	Jean Street	0.40	N	S	HCB	8		6		0-49	4.50	$ 352,000
243	Jean Street	Rosedale Avenue	Marydale Avenue	0.30	N	S	HCB	8		6		50-199	5.50	$ 264,000
244	Thomas Street	Jean Street	Daisy Street	0.40	N	S	HCB	8		6		0-49	4.75	$ 352,000
245	Bruce Street	Dead End	Cornwall Center Road	1.00	N	S	HCB	8		6			4.75	$ 880,000
246	Virgina Street	Highway 138	Bruce Street	0.15	N	S	HCB	8		6		0-49	5.75	$ 132,000
247	Marlyn Street	Highway 138	Bruce Street	0.15	N	S	HCB	8		6		0-49	8.50	$ 132,000
248	Stephen Street	Highway 138	Bruce Street	0.15	N	S	HCB	8		6		0-49	8.50	$ 132,000
249	Cheryl Street	Marydale Avenue	Highway 138	0.45	N	S	HCB	8		6			4.75	$ 396,000
-	Abigail Court	County Road 35	County Road 35	0.50	N	S	HBC	9		7	N	0-49	9.00	$ 440,000
-	Barry Street	Barnhart Drive	Dead End	0.10	N	S	HBC	9		7	N	0-49	8.00	$ 88,000
-	Walner Street	Barnhart Drive	Dead End	0.10	N	S	HBC	9		7	N	0-49	8.00	$ 88,000
-	Forest Hills Road	County Road 36	Fickes Road	0.90	N	S	HCB	9		7	N	0-49	8.00	$ 792,000
-	Hickory Street	Piercy Street	Dead End	0.10	N	S	HCB	9		7	N	0-49	9.00	$ 88,000
-	Cypress Lane	Hickory Street	Dead End	0.30	N	S	HCB	9		7	N	0-49	8.00	$ 264,000
-	Penny Lane	Thompson Drive	Columbia Avenue	0.30	N	S	HCB	9		7	N	0-49	6.50	$ 264,000
WEIGHTED AVERAGE CONDITION RATING FOR HIGH CLASS BITUMINOUS SURFACE (R)													6.33	
TOTAL KILOMETRES				42.15										$ 37,092,000

TABLE A.5 – INVENTORY AND REPLACEMENT COST VALUATION – ASPHALT ROADS (URBAN)

No.	STREET	FROM	TO	Km	BOUND RD.	ENVIR	TYPE	PLAT. WIDTH	SURF WIDTH	R.O.W. WIDTH	SCHOOL BUS ROUTE	TRAFFIC RANGE	CONDITION RATING IN 2011	REPLACEMENT COST VALUATION
167	Memorial Square East	Maple Street	College Street	0.25	N	U	HCB			7	Y	0-49	5.75	$ 307,750
168	Memorial Square West	College Street	Maple Street	0.25	N	U	HCB			8	Y	0-49	5.75	$ 307,750
173	Ault Street	Hickory Street	Dead End	0.10	N	U	HCB			7.5	N	0-49	8.00	$ 123,100
174B	Wildwood Street	Ault Street	Dead End	0.15	N	U	HCB			7.5	N	0-49	5.75	$ 184,650
196	Barnhart Drive	Mille Roches Road	Dead End	0.50	N	U	HCB			9	N	0-49	7.00	$ 615,500
198	Cherry Street	Mille Roche Road	French Avenue	0.40	N	U	HCB			7	N		6.75	$ 492,400
WEIGHTED AVERAGE CONDITION RATING FOR HIGH CLASS BITUMINOUS SURFACE (U)													**6.51**	
TOTAL KILOMETERS				**1.65**										**$ 2,031,150**

TABLE A.6 – INVENTORY AND REPLACEMENT COST VALUATION – EARTH ROADS

No.	STREET	FROM	TO	Km	BOUND RD.	ENVIR	TYPE	PLAT. WIDTH	SURF WIDTH	R.O.W. WIDTH	SCHOOL BUS ROUTE	TRAFFIC RANGE	CONDITION RATING IN 2011	REPLACEMENT COST VALUATION
096B	Rombough Road	County Road 18	Dead End	1.40	N	R	E				N	0-49	1.00	N/A
118B	Allen Road	Lalonde Road	Nine Mile Road	1.40	N	R	E	4			N	0-49	2.00	N/A
119	Nine Mile Road	Allen Road	Hunters Road	2.10	N	R	E	4			N	0-49	2.00	N/A
170	Shaver Road	0.7km north of Colonial Drive	Dead End	1.00	N	R	E	6.5			N	0-49	2.00	N/A
120	Lalonde Road	Allen Road	Collins Road	2.20	N	R	E	5			N	0-49	4.00	N/A
TOTAL KILOMETERS - EARTH SURFACE				**8.10**										

TABLE A.7 – INVENTORY AND REPLACEMENT COST VALUATION – BRIDGES

ASSET ID	ROAD NAME	REPLACEMENT COST
BRIDGES		
31-170	North Lunenburg Road West	$ 730,000.00
31-175	Valade Road	$ 1,280,000.00
31-181	Lefave Road	$ 920,000.00
31-182	Delaney Road	$ 1,070,000.00
31-186	Delaney Road	$ 600,000.00
31-187	McPhail Road	$ 690,000.00
31-208	Barlow Road	$ 510,000.00
31-303	Shaver Road	$ 670,000.00
31-A21	Morgan Road	$ 680,000.00
SUB-TOTAL (BRIDGES)		**$ 7,150,000.00**
STRUCTURAL CULVERTS		
C31-167	North Lunenburg Road West	$ 150,000.00
C31-169	North Lunenburg Road West	$ 170,000.00
C31-A01	Goldfield Road	$ 160,000.00
C31-A02	Hunter Road	$ 170,000.00
C31-A03	Otto Road	$ 180,000.00
C31-A04	Hart Road	$ 130,000.00
C31-A05	Bruining Road	$ 360,000.00
C31-A06	Beckstead Road	$ 140,000.00
C31-A07	Pleasant Valley Road	$ 150,000.00
C31-A08	Anderson Road	$ 230,000.00
C31-A10	Finch-Osnabruck Boundary Road	$ 140,000.00
C31-A12	Cooper Road	$ 310,000.00
C31-A13	Wilburn Road	$ 130,000.00
C31-A15	MacRae Road	$ 140,000.00
C31-A16	Northfield Road	$ 150,000.00
C31-A17	Myers Road	$ 280,000.00
C31-A18	O'Keefe Road	$ 130,000.00
C31-A19	Willy Bill Road	$ 120,000.00
C31-A20	Island Road	$ 120,000.00
SUB-TOTAL (CULVERTS)		**$ 3,360,000.00**
TOTAL (BRIDGES + CULVERTS)		**$ 10,510,000.00**

TABLE A.8 – INVENTORY AND REPLACEMENT COST VALUATION – 50mm-100mm WATERMAIN

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
427	Long Sault/Ingleside	2.44	50	DI	$ 488
14	Eamers Corners/St.Andrews	221.71	75	PVC	$ 44,342
15	Eamers Corners/St.Andrews	255.53	75	PVC	$ 51,105
594	Eamers Corners/St.Andrews	68.49	75	PVC	$ 13,698
595	Eamers Corners/St.Andrews	121.52	75	PVC	$ 24,303
596	Eamers Corners/St.Andrews	167.66	75	PVC	$ 33,532
597	Eamers Corners/St.Andrews	52.67	75	PVC	$ 10,534
649	Eamers Corners/St.Andrews	127.00	75	PVC	$ 25,399
650	Eamers Corners/St.Andrews	233.03	75	PVC	$ 46,607
248	Long Sault/Ingleside	7.95	100	DI	$ 1,589
548	Newington	187.55	100	PVC	$ 37,511
549	Newington	101.88	100	PVC	$ 20,376
550	Newington	14.77	100	PVC	$ 2,953
551	Newington	291.17	100	PVC	$ 58,234
552	Newington	34.23	100	PVC	$ 6,845
553	Newington	183.27	100	PVC	$ 36,653
554	Newington	198.99	100	PVC	$ 39,798
555	Newington	24.64	100	PVC	$ 4,927
556	Newington	101.70	100	PVC	$ 20,340
557	Newington	98.81	100	PVC	$ 19,761
558	Newington	12.97	100	PVC	$ 2,594
559	Newington	194.21	100	PVC	$ 38,841
560	Newington	4.34	100	PVC	$ 869
561	Newington	189.83	100	PVC	$ 37,966
562	Newington	143.43	100	PVC	$ 28,686
563	Newington	6.94	100	PVC	$ 1,387
564	Newington	27.72	100	PVC	$ 5,544
565	Newington	3.13	100	PVC	$ 626
573	Newington	2.01	100	PVC	$ 402
589	Newington	14.99	100	PVC	$ 2,998
590	Newington	3.33	100	PVC	$ 667
591	Newington	8.54	100	PVC	$ 1,709
TOTAL		**3106.43**			**$ 621,287**

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
1	Eamers Corners/St.Andrews	108.10	150	PVC	$ 29,728
16	Eamers Corners/St.Andrews	21.28	150	PVC	$ 5,851
17	Eamers Corners/St.Andrews	30.33	150	PVC	$ 8,341
18	Eamers Corners/St.Andrews	28.89	150	PVC	$ 7,944
19	Eamers Corners/St.Andrews	148.69	150	PVC	$ 40,889
20	Eamers Corners/St.Andrews	6.51	150	PVC	$ 1,791
23	Eamers Corners/St.Andrews	107.50	150	PVC	$ 29,563
24	Eamers Corners/St.Andrews	120.30	150	PVC	$ 33,081
25	Eamers Corners/St.Andrews	102.12	150	PVC	$ 28,083
26	Eamers Corners/St.Andrews	105.07	150	PVC	$ 28,895
28	Eamers Corners/St.Andrews	7.88	150	PVC	$ 2,168
33	Eamers Corners/St.Andrews	87.09	150	PVC	$ 23,950
35	Eamers Corners/St.Andrews	6.45	150	PVC	$ 1,774
36	Eamers Corners/St.Andrews	70.82	150	PVC	$ 19,475
47	Eamers Corners/St.Andrews	158.97	150	PVC	$ 43,716
48	Eamers Corners/St.Andrews	157.99	150	PVC	$ 43,448
49	Eamers Corners/St.Andrews	139.88	150	PVC	$ 38,466
50	Eamers Corners/St.Andrews	129.05	150	PVC	$ 35,488
51	Eamers Corners/St.Andrews	96.78	150	PVC	$ 26,613
59	Eamers Corners/St.Andrews	93.14	150	PVC	$ 25,613
61	Eamers Corners/St.Andrews	142.18	150	PVC	$ 39,100
62	Eamers Corners/St.Andrews	105.73	150	PVC	$ 29,077
63	Eamers Corners/St.Andrews	125.93	150	PVC	$ 34,630
64	Eamers Corners/St.Andrews	143.34	150	PVC	$ 39,418
65	Eamers Corners/St.Andrews	6.35	150	PVC	$ 1,746
66	Eamers Corners/St.Andrews	6.65	150	PVC	$ 1,827
67	Eamers Corners/St.Andrews	108.88	150	PVC	$ 29,943
68	Eamers Corners/St.Andrews	134.98	150	PVC	$ 37,118
69	Eamers Corners/St.Andrews	375.21	150	PVC	$ 103,184
70	Eamers Corners/St.Andrews	121.62	150	PVC	$ 33,446
71	Eamers Corners/St.Andrews	153.84	150	PVC	$ 42,307
73	Eamers Corners/St.Andrews	96.20	150	PVC	$ 26,454
75	Eamers Corners/St.Andrews	103.18	150	PVC	$ 28,375
76	Eamers Corners/St.Andrews	50.37	150	PVC	$ 13,852
77	Eamers Corners/St.Andrews	90.34	150	PVC	$ 24,845
78	Eamers Corners/St.Andrews	129.99	150	PVC	$ 35,747
124	Eamers Corners/St.Andrews	132.20	150	PVC	$ 36,356
125	Eamers Corners/St.Andrews	4.48	150	PVC	$ 1,231
126	Eamers Corners/St.Andrews	107.23	150	PVC	$ 29,489
129	Eamers Corners/St.Andrews	111.75	150	PVC	$ 30,732
130	Eamers Corners/St.Andrews	4.95	150	PVC	$ 1,360
131	Eamers Corners/St.Andrews	108.13	150	PVC	$ 29,735
132	Eamers Corners/St.Andrews	6.44	150	PVC	$ 1,771
133	Eamers Corners/St.Andrews	234.78	150	PVC	$ 64,563
134	Eamers Corners/St.Andrews	0.11	150	PVC	$ 30

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
135	Eamers Corners/St.Andrews	163.35	150	PVC	$ 44,920
136	Long Sault/Ingleside	108.06	150	PVC	$ 29,716
137	Long Sault/Ingleside	4.01	150	PVC	$ 1,102
138	Long Sault/Ingleside	117.02	150	PVC	$ 32,180
139	Long Sault/Ingleside	4.60	150	PVC	$ 1,266
140	Long Sault/Ingleside	3.64	150	PVC	$ 1,002
141	Long Sault/Ingleside	49.41	150	PVC	$ 13,587
142	Long Sault/Ingleside	6.07	150	PVC	$ 1,668
143	Long Sault/Ingleside	245.87	150	DI	$ 67,614
144	Long Sault/Ingleside	0.69	150	DI	$ 190
145	Long Sault/Ingleside	361.67	150	DI	$ 99,460
146	Long Sault/Ingleside	130.21	150	DI	$ 35,808
147	Long Sault/Ingleside	2.92	150	DI	$ 802
148	Long Sault/Ingleside	3.61	150	DI	$ 994
149	Long Sault/Ingleside	3.75	150	DI	$ 1,032
150	Long Sault/Ingleside	166.03	150	DI	$ 45,660
152	Long Sault/Ingleside	3.21	150	DI	$ 881
163	Long Sault/Ingleside	165.60	150	DI	$ 45,539
164	Long Sault/Ingleside	167.34	150	DI	$ 46,019
165	Long Sault/Ingleside	166.54	150	DI	$ 45,797
166	Long Sault/Ingleside	175.25	150	DI	$ 48,194
168	Long Sault/Ingleside	4.05	150	DI	$ 1,114
169	Long Sault/Ingleside	3.56	150	DI	$ 980
170	Long Sault/Ingleside	4.06	150	DI	$ 1,117
173	Long Sault/Ingleside	2.97	150	PVC	$ 816
174	Long Sault/Ingleside	2.93	150	PVC	$ 805
175	Long Sault/Ingleside	2.67	150	PVC	$ 736
176	Long Sault/Ingleside	52.46	150	DI	$ 14,427
177	Long Sault/Ingleside	396.30	150	PVC	$ 108,983
178	Long Sault/Ingleside	0.27	150	PVC	$ 73
179	Long Sault/Ingleside	175.70	150	DI	$ 48,318
180	Long Sault/Ingleside	3.04	150	DI	$ 835
181	Long Sault/Ingleside	6.04	150	DI	$ 1,660
182	Long Sault/Ingleside	114.00	150	DI	$ 31,350
188	Long Sault/Ingleside	377.08	150	DI	$ 103,697
189	Long Sault/Ingleside	156.37	150	DI	$ 43,002
190	Long Sault/Ingleside	12.37	150	DI	$ 3,401
191	Long Sault/Ingleside	224.86	150	DI	$ 61,836
192	Long Sault/Ingleside	3.41	150	DI	$ 938
193	Long Sault/Ingleside	4.02	150	DI	$ 1,105
194	Long Sault/Ingleside	260.68	150	DI	$ 71,686
195	Long Sault/Ingleside	3.95	150	DI	$ 1,086
196	Long Sault/Ingleside	5.78	150	DI	$ 1,588
197	Long Sault/Ingleside	459.96	150	DI	$ 126,488
198	Long Sault/Ingleside	180.93	150	DI	$ 49,756

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
199	Long Sault/Ingleside	35.62	150	DI	$ 9,796
200	Long Sault/Ingleside	138.24	150	DI	$ 38,015
201	Long Sault/Ingleside	96.25	150	DI	$ 26,468
202	Long Sault/Ingleside	110.86	150	DI	$ 30,487
203	Long Sault/Ingleside	40.15	150	DI	$ 11,042
204	Long Sault/Ingleside	2.47	150	DI	$ 680
205	Long Sault/Ingleside	2.19	150	DI	$ 602
206	Long Sault/Ingleside	2.88	150	DI	$ 792
207	Long Sault/Ingleside	3.90	150	DI	$ 1,073
208	Long Sault/Ingleside	1.75	150	DI	$ 482
209	Long Sault/Ingleside	6.53	150	DI	$ 1,797
214	Long Sault/Ingleside	18.53	150	DI	$ 5,095
215	Long Sault/Ingleside	389.01	150	DI	$ 106,979
216	Long Sault/Ingleside	10.97	150	DI	$ 3,018
217	Long Sault/Ingleside	371.60	150	DI	$ 102,189
218	Long Sault/Ingleside	3.10	150	DI	$ 853
219	Long Sault/Ingleside	4.74	150	DI	$ 1,304
220	Long Sault/Ingleside	2.69	150	DI	$ 739
221	Long Sault/Ingleside	3.25	150	DI	$ 893
236	Long Sault/Ingleside	17.98	150	DI	$ 4,944
237	Long Sault/Ingleside	245.96	150	DI	$ 67,638
238	Long Sault/Ingleside	5.57	150	DI	$ 1,532
239	Long Sault/Ingleside	4.17	150	DI	$ 1,147
240	Long Sault/Ingleside	0.68	150	DI	$ 188
255	Long Sault/Ingleside	17.11	150	DI	$ 4,707
256	Long Sault/Ingleside	243.81	150	DI	$ 67,047
257	Long Sault/Ingleside	7.54	150	DI	$ 2,073
263	Long Sault/Ingleside	212.61	150	DI	$ 58,467
264	Long Sault/Ingleside	160.24	150	DI	$ 44,067
265	Long Sault/Ingleside	3.46	150	DI	$ 951
266	Long Sault/Ingleside	3.19	150	DI	$ 877
267	Long Sault/Ingleside	55.33	150	DI	$ 15,215
268	Long Sault/Ingleside	65.51	150	DI	$ 18,015
269	Long Sault/Ingleside	38.01	150	DI	$ 10,452
270	Long Sault/Ingleside	509.89	150	DI	$ 140,219
271	Long Sault/Ingleside	13.45	150	DI	$ 3,698
272	Long Sault/Ingleside	25.05	150	DI	$ 6,889
273	Long Sault/Ingleside	271.64	150	DI	$ 74,700
274	Long Sault/Ingleside	182.69	150	DI	$ 50,239
275	Long Sault/Ingleside	1.47	150	DI	$ 405
276	Long Sault/Ingleside	2.88	150	DI	$ 792
277	Long Sault/Ingleside	2.02	150	DI	$ 554
278	Long Sault/Ingleside	111.24	150	DI	$ 30,592
279	Long Sault/Ingleside	143.15	150	DI	$ 39,365
280	Long Sault/Ingleside	9.74	150	DI	$ 2,677

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
281	Long Sault/Ingleside	122.73	150	DI	$ 33,750
282	Long Sault/Ingleside	7.70	150	DI	$ 2,116
283	Long Sault/Ingleside	4.06	150	DI	$ 1,115
284	Long Sault/Ingleside	1.36	150	DI	$ 373
285	Long Sault/Ingleside	273.07	150	DI	$ 75,093
286	Long Sault/Ingleside	94.94	150	DI	$ 26,108
287	Long Sault/Ingleside	2.82	150	DI	$ 775
288	Long Sault/Ingleside	16.88	150	DI	$ 4,641
289	Long Sault/Ingleside	179.31	150	PVC	$ 49,310
290	Long Sault/Ingleside	312.78	150	PVC	$ 86,014
291	Long Sault/Ingleside	812.04	150	PVC	$ 223,312
292	Long Sault/Ingleside	66.29	150	PVC	$ 18,229
293	Long Sault/Ingleside	5.69	150	PVC	$ 1,565
294	Long Sault/Ingleside	494.66	150	PVC	$ 136,031
295	Long Sault/Ingleside	5.63	150	PVC	$ 1,547
296	Long Sault/Ingleside	5.77	150	PVC	$ 1,586
297	Long Sault/Ingleside	340.31	150	PVC	$ 93,584
298	Long Sault/Ingleside	8.42	150	PVC	$ 2,317
299	Long Sault/Ingleside	779.72	150	PVC	$ 214,422
300	Long Sault/Ingleside	6.67	150	PVC	$ 1,835
301	Long Sault/Ingleside	3.11	150	PVC	$ 856
302	Long Sault/Ingleside	2.52	150	PVC	$ 693
324	Long Sault/Ingleside	210.27	150	DI	$ 57,825
325	Long Sault/Ingleside	5.18	150	DI	$ 1,425
326	Long Sault/Ingleside	4.99	150	DI	$ 1,371
327	Long Sault/Ingleside	967.30	150	DI	$ 266,007
328	Long Sault/Ingleside	4.80	150	DI	$ 1,320
329	Long Sault/Ingleside	6.09	150	DI	$ 1,675
330	Long Sault/Ingleside	5.20	150	DI	$ 1,431
331	Long Sault/Ingleside	14.23	150	DI	$ 3,912
332	Long Sault/Ingleside	8.37	150	DI	$ 2,301
333	Long Sault/Ingleside	8.98	150	DI	$ 2,469
334	Long Sault/Ingleside	5.81	150	DI	$ 1,597
340	Long Sault/Ingleside	141.93	150	DI	$ 39,031
341	Long Sault/Ingleside	462.05	150	DI	$ 127,065
342	Long Sault/Ingleside	7.50	150	DI	$ 2,063
343	Long Sault/Ingleside	6.83	150	DI	$ 1,879
344	Long Sault/Ingleside	11.46	150	DI	$ 3,152
345	Long Sault/Ingleside	9.17	150	DI	$ 2,523
346	Long Sault/Ingleside	5.24	150	DI	$ 1,442
359	Long Sault/Ingleside	105.15	150	DI	$ 28,917
360	Long Sault/Ingleside	1.10	150	DI	$ 303
361	Long Sault/Ingleside	6.20	150	DI	$ 1,704
364	Long Sault/Ingleside	85.38	150	DI	$ 23,480
365	Long Sault/Ingleside	11.45	150	DI	$ 3,147

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
366	Long Sault/Ingleside	82.20	150	DI	$ 22,604
367	Long Sault/Ingleside	363.29	150	DI	$ 99,904
368	Long Sault/Ingleside	3.75	150	DI	$ 1,031
369	Long Sault/Ingleside	4.07	150	DI	$ 1,118
370	Long Sault/Ingleside	105.34	150	DI	$ 28,968
371	Long Sault/Ingleside	15.03	150	DI	$ 4,133
372	Long Sault/Ingleside	9.19	150	DI	$ 2,528
373	Long Sault/Ingleside	356.55	150	DI	$ 98,050
374	Long Sault/Ingleside	14.62	150	DI	$ 4,019
375	Long Sault/Ingleside	16.50	150	DI	$ 4,537
376	Long Sault/Ingleside	12.48	150	DI	$ 3,431
377	Long Sault/Ingleside	17.07	150	DI	$ 4,693
378	Long Sault/Ingleside	15.72	150	DI	$ 4,322
379	Long Sault/Ingleside	13.61	150	DI	$ 3,742
380	Long Sault/Ingleside	269.72	150	DI	$ 74,173
381	Long Sault/Ingleside	7.04	150	DI	$ 1,935
382	Long Sault/Ingleside	247.55	150	DI	$ 68,076
389	Long Sault/Ingleside	6.77	150	PVC	$ 1,861
390	Long Sault/Ingleside	367.27	150	PVC	$ 100,998
391	Long Sault/Ingleside	428.03	150	DI	$ 117,708
392	Long Sault/Ingleside	1.60	150	PVC	$ 440
393	Long Sault/Ingleside	15.17	150	PVC	$ 4,172
394	Long Sault/Ingleside	3.74	150	DI	$ 1,029
395	Long Sault/Ingleside	6.96	150	DI	$ 1,915
396	Long Sault/Ingleside	11.22	150	DI	$ 3,087
397	Long Sault/Ingleside	336.80	150	DI	$ 92,620
398	Long Sault/Ingleside	5.75	150	DI	$ 1,581
399	Long Sault/Ingleside	4.74	150	DI	$ 1,302
400	Long Sault/Ingleside	114.29	150	DI	$ 31,429
401	Long Sault/Ingleside	10.84	150	DI	$ 2,980
402	Long Sault/Ingleside	2.87	150	DI	$ 790
403	Long Sault/Ingleside	6.98	150	DI	$ 1,920
404	Long Sault/Ingleside	93.78	150	DI	$ 25,791
405	Long Sault/Ingleside	7.07	150	DI	$ 1,945
406	Long Sault/Ingleside	374.95	150	DI	$ 103,112
407	Long Sault/Ingleside	3.29	150	DI	$ 905
408	Long Sault/Ingleside	0.68	150	DI	$ 187
409	Long Sault/Ingleside	2.28	150	DI	$ 628
410	Long Sault/Ingleside	352.37	150	DI	$ 96,903
411	Long Sault/Ingleside	147.91	150	DI	$ 40,676
412	Long Sault/Ingleside	14.98	150	DI	$ 4,118
413	Long Sault/Ingleside	2.75	150	DI	$ 755
414	Long Sault/Ingleside	280.95	150	DI	$ 77,262
415	Long Sault/Ingleside	90.43	150	DI	$ 24,868
416	Long Sault/Ingleside	357.07	150	DI	$ 98,194

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
417	Long Sault/Ingleside	4.72	150	DI	$ 1,297
418	Long Sault/Ingleside	174.30	150	DI	$ 47,933
419	Long Sault/Ingleside	103.66	150	DI	$ 28,506
420	Long Sault/Ingleside	5.59	150	DI	$ 1,538
421	Long Sault/Ingleside	1.97	150	DI	$ 541
422	Long Sault/Ingleside	2.35	150	DI	$ 645
423	Long Sault/Ingleside	2.58	150	DI	$ 710
424	Long Sault/Ingleside	3.19	150	DI	$ 878
425	Long Sault/Ingleside	2.08	150	DI	$ 573
426	Long Sault/Ingleside	1.33	150	DI	$ 367
429	Long Sault/Ingleside	5.74	150	DI	$ 1,577
433	Long Sault/Ingleside	5.88	150	DI	$ 1,618
439	Long Sault/Ingleside	8.14	150	DI	$ 2,240
440	Long Sault/Ingleside	5.00	150	DI	$ 1,375
441	Long Sault/Ingleside	185.62	150	DI	$ 51,047
442	Long Sault/Ingleside	6.82	150	DI	$ 1,876
443	Long Sault/Ingleside	94.05	150	DI	$ 25,864
444	Long Sault/Ingleside	229.71	150	DI	$ 63,172
446	Long Sault/Ingleside	6.65	150	DI	$ 1,829
447	Long Sault/Ingleside	3.01	150	DI	$ 829
448	Long Sault/Ingleside	145.02	150	DI	$ 39,880
449	Long Sault/Ingleside	5.35	150	DI	$ 1,471
450	Long Sault/Ingleside	2.52	150	DI	$ 694
451	Long Sault/Ingleside	5.01	150	DI	$ 1,379
452	Long Sault/Ingleside	3.63	150	DI	$ 999
453	Long Sault/Ingleside	187.96	150	DI	$ 51,688
455	Long Sault/Ingleside	286.00	150	DI	$ 78,651
456	Long Sault/Ingleside	11.28	150	DI	$ 3,101
461	Long Sault/Ingleside	8.02	150	PVC	$ 2,207
462	Long Sault/Ingleside	188.48	150	PVC	$ 51,831
463	Long Sault/Ingleside	400.06	150	PVC	$ 110,018
464	Long Sault/Ingleside	6.02	150	PVC	$ 1,655
465	Long Sault/Ingleside	2.70	150	PVC	$ 744
466	Long Sault/Ingleside	13.54	150	PVC	$ 3,724
467	Long Sault/Ingleside	14.92	150	PVC	$ 4,104
468	Long Sault/Ingleside	7.84	150	PVC	$ 2,157
469	Long Sault/Ingleside	11.86	150	PVC	$ 3,262
470	Long Sault/Ingleside	295.30	150	PVC	$ 81,207
475	Long Sault/Ingleside	139.37	150	PVC	$ 38,328
476	Long Sault/Ingleside	336.13	150	PVC	$ 92,436
481	Long Sault/Ingleside	2.98	150	PVC	$ 819
483	Long Sault/Ingleside	3.63	150	PVC	$ 999
484	Long Sault/Ingleside	2.87	150	PVC	$ 790
487	Long Sault/Ingleside	8.02	150	PVC	$ 2,206
488	Long Sault/Ingleside	73.17	150	PVC	$ 20,121

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
489	Long Sault/Ingleside	264.73	150	PVC	$ 72,802
490	Long Sault/Ingleside	5.38	150	PVC	$ 1,478
491	Long Sault/Ingleside	5.59	150	PVC	$ 1,538
492	Long Sault/Ingleside	9.95	150	PVC	$ 2,735
493	Long Sault/Ingleside	280.01	150	PVC	$ 77,002
494	Long Sault/Ingleside	3.95	150	PVC	$ 1,085
496	Long Sault/Ingleside	104.47	150	DI	$ 28,730
518	Long Sault/Ingleside	215.35	150	PVC	$ 59,220
519	Long Sault/Ingleside	10.77	150	PVC	$ 2,961
520	Long Sault/Ingleside	178.50	150	PVC	$ 49,087
521	Long Sault/Ingleside	4.99	150	PVC	$ 1,373
523	Long Sault/Ingleside	10.56	150	PVC	$ 2,905
524	Long Sault/Ingleside	24.22	150	PVC	$ 6,659
526	Long Sault/Ingleside	117.36	150	PVC	$ 32,275
527	Long Sault/Ingleside	6.97	150	PVC	$ 1,917
528	Long Sault/Ingleside	4.91	150	PVC	$ 1,350
529	Long Sault/Ingleside	4.82	150	PVC	$ 1,325
533	Long Sault/Ingleside	2.25	150	PVC	$ 619
535	Long Sault/Ingleside	2.91	150	DI	$ 800
536	Long Sault/Ingleside	8.72	150	DI	$ 2,397
541	Long Sault/Ingleside	0.26	150	DI	$ 73
544	Long Sault/Ingleside	501.91	150	DI	$ 138,027
545	Long Sault/Ingleside	8.63	150	DI	$ 2,373
569	Eamers Corners/St.Andrews	5.98	150	PVC	$ 1,645
575	Eamers Corners/St.Andrews	5.99	150	PVC	$ 1,647
576	Eamers Corners/St.Andrews	6.38	150	PVC	$ 1,755
577	Eamers Corners/St.Andrews	11.53	150	PVC	$ 3,172
578	Eamers Corners/St.Andrews	7.33	150	PVC	$ 2,016
579	Eamers Corners/St.Andrews	12.50	150	PVC	$ 3,437
580	Eamers Corners/St.Andrews	9.81	150	PVC	$ 2,697
581	Eamers Corners/St.Andrews	7.51	150	PVC	$ 2,066
582	Eamers Corners/St.Andrews	12.50	150	PVC	$ 3,437
583	Eamers Corners/St.Andrews	7.50	150	PVC	$ 2,064
584	Eamers Corners/St.Andrews	5.71	150	PVC	$ 1,570
585	Eamers Corners/St.Andrews	0.98	150	PVC	$ 270
586	Eamers Corners/St.Andrews	1.91	150	PVC	$ 524
587	Eamers Corners/St.Andrews	0.82	150	PVC	$ 227
588	Eamers Corners/St.Andrews	7.65	150	PVC	$ 2,103
592	Eamers Corners/St.Andrews	6.04	150	PVC	$ 1,660
593	Eamers Corners/St.Andrews	6.92	150	PVC	$ 1,904
598	Eamers Corners/St.Andrews	148.56	150	PVC	$ 40,855
607	Eamers Corners/St.Andrews	7.99	150	PVC	$ 2,198
608	Eamers Corners/St.Andrews	7.48	150	PVC	$ 2,058
609	Eamers Corners/St.Andrews	3.29	150	PVC	$ 904
610	Eamers Corners/St.Andrews	127.31	150	PVC	$ 35,010

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
611	Eamers Corners/St.Andrews	5.02	150	PVC	$ 1,381
612	Eamers Corners/St.Andrews	110.55	150	PVC	$ 30,401
613	Eamers Corners/St.Andrews	122.28	150	PVC	$ 33,627
614	Eamers Corners/St.Andrews	12.12	150	PVC	$ 3,334
616	Eamers Corners/St.Andrews	141.01	150	PVC	$ 38,777
617	Eamers Corners/St.Andrews	19.61	150	PVC	$ 5,392
618	Eamers Corners/St.Andrews	7.51	150	PVC	$ 2,065
625	Eamers Corners/St.Andrews	4.67	150	PVC	$ 1,284
626	Eamers Corners/St.Andrews	12.81	150	PVC	$ 3,522
627	Eamers Corners/St.Andrews	154.46	150	PVC	$ 42,476
628	Eamers Corners/St.Andrews	8.37	150	PVC	$ 2,301
629	Eamers Corners/St.Andrews	18.56	150	PVC	$ 5,105
632	Eamers Corners/St.Andrews	12.77	150	PVC	$ 3,511
633	Eamers Corners/St.Andrews	8.40	150	PVC	$ 2,311
634	Eamers Corners/St.Andrews	166.43	150	PVC	$ 45,767
635	Eamers Corners/St.Andrews	13.39	150	PVC	$ 3,682
636	Eamers Corners/St.Andrews	127.14	150	PVC	$ 34,965
637	Eamers Corners/St.Andrews	12.26	150	PVC	$ 3,371
639	Eamers Corners/St.Andrews	10.42	150	PVC	$ 2,864
640	Eamers Corners/St.Andrews	111.58	150	PVC	$ 30,684
641	Eamers Corners/St.Andrews	16.19	150	PVC	$ 4,451
642	Eamers Corners/St.Andrews	69.02	150	PVC	$ 18,979
643	Eamers Corners/St.Andrews	110.87	150	PVC	$ 30,490
644	Eamers Corners/St.Andrews	17.15	150	PVC	$ 4,715
645	Eamers Corners/St.Andrews	110.97	150	PVC	$ 30,517
646	Eamers Corners/St.Andrews	21.96	150	PVC	$ 6,039
647	Eamers Corners/St.Andrews	17.66	150	PVC	$ 4,858
664	Eamers Corners/St.Andrews	13.45	150	PVC	$ 3,698
665	Eamers Corners/St.Andrews	55.65	150	PVC	$ 15,303
666	Eamers Corners/St.Andrews	94.64	150	PVC	$ 26,026
667	Eamers Corners/St.Andrews	19.43	150	PVC	$ 5,344
668	Eamers Corners/St.Andrews	65.26	150	PVC	$ 17,947
669	Eamers Corners/St.Andrews	125.28	150	PVC	$ 34,453
670	Eamers Corners/St.Andrews	98.37	150	PVC	$ 27,053
671	Eamers Corners/St.Andrews	2.06	150	PVC	$ 567
672	Eamers Corners/St.Andrews	3.53	150	PVC	$ 970
691	Eamers Corners/St.Andrews	50.33	150	PVC	$ 13,840
692	Eamers Corners/St.Andrews	49.84	150	PVC	$ 13,707
693	Eamers Corners/St.Andrews	97.60	150	PVC	$ 26,839
694	Eamers Corners/St.Andrews	19.24	150	PVC	$ 5,290
695	Eamers Corners/St.Andrews	6.22	150	PVC	$ 1,711
696	Eamers Corners/St.Andrews	86.21	150	PVC	$ 23,709
697	Eamers Corners/St.Andrews	21.72	150	PVC	$ 5,973
698	Eamers Corners/St.Andrews	5.24	150	PVC	$ 1,441
699	Eamers Corners/St.Andrews	21.09	150	PVC	$ 5,800

TABLE A.9 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
700	Eamers Corners/St.Andrews	54.50	150	PVC	$ 14,989
701	Eamers Corners/St.Andrews	7.98	150	PVC	$ 2,195
704	Eamers Corners/St.Andrews	11.64	150	PVC	$ 3,202
706	Eamers Corners/St.Andrews	7.72	150	PVC	$ 2,122
735	Long Sault/Ingleside	223.66	150	PVC	$ 61,506
737	Long Sault/Ingleside	62.66	150	DI	$ 17,232
738	Long Sault/Ingleside	14.55	150	DI	$ 4,001
742	Long Sault/Ingleside	170.46	150	DI	$ 46,876
743	Long Sault/Ingleside	1.40	150	PVC	$ 384
744	Long Sault/Ingleside	2.99	150	DI	$ 821
745	Long Sault/Ingleside	90.72	150	PVC	$ 24,949
746	Long Sault/Ingleside	3.32	150	DI	$ 912
747	Long Sault/Ingleside	82.88	150	DI	$ 22,793
748	Long Sault/Ingleside	58.58	150	DI	$ 16,109
749	Long Sault/Ingleside	93.32	150	PVC	$ 25,663
750	Long Sault/Ingleside	265.06	150	PVC	$ 72,892
754	Long Sault/Ingleside	887.58	150	DI	$ 244,085
755	Long Sault/Ingleside	5.51	150	DI	$ 1,514
756	Long Sault/Ingleside	505.88	150	PVC	$ 139,118
TOTAL		**$ 32,715**			**$ 8,996,685**

TABLE A.10 – INVENTORY AND REPLACEMENT COST VALUATION – 200mm WATERMAIN

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
153	Long Sault/Ingleside	14.31	200	DI	$ 5,007
158	Long Sault/Ingleside	31.86	200	DI	$ 11,152
161	Long Sault/Ingleside	165.44	200	DI	$ 57,904
162	Long Sault/Ingleside	267.41	200	DI	$ 93,593
167	Long Sault/Ingleside	4.14	200	DI	$ 1,449
171	Long Sault/Ingleside	2.14	200	DI	$ 750
172	Long Sault/Ingleside	5.32	200	DI	$ 1,862
184	Long Sault/Ingleside	3.39	200	DI	$ 1,186
185	Long Sault/Ingleside	3.12	200	DI	$ 1,093
186	Long Sault/Ingleside	219.35	200	DI	$ 76,774
187	Long Sault/Ingleside	3.42	200	DI	$ 1,197
223	Long Sault/Ingleside	7.15	200	DI	$ 2,503
224	Long Sault/Ingleside	4.50	200	DI	$ 1,574
225	Long Sault/Ingleside	12.49	200	DI	$ 4,373
226	Long Sault/Ingleside	12.77	200	DI	$ 4,470
227	Long Sault/Ingleside	12.85	200	DI	$ 4,497
247	Long Sault/Ingleside	199.54	200	DI	$ 69,839
258	Long Sault/Ingleside	116.87	200	DI	$ 40,903
259	Long Sault/Ingleside	19.08	200	DI	$ 6,678
260	Long Sault/Ingleside	12.08	200	DI	$ 4,229
261	Long Sault/Ingleside	200.48	200	DI	$ 70,168
262	Long Sault/Ingleside	6.08	200	DI	$ 2,128
335	Long Sault/Ingleside	5.69	200	DI	$ 1,991
336	Long Sault/Ingleside	99.17	200	DI	$ 34,710
337	Long Sault/Ingleside	5.71	200	DI	$ 1,997
338	Long Sault/Ingleside	11.96	200	DI	$ 4,187
339	Long Sault/Ingleside	132.99	200	DI	$ 46,547
347	Long Sault/Ingleside	250.30	200	DI	$ 87,605
348	Long Sault/Ingleside	6.09	200	DI	$ 2,132
349	Long Sault/Ingleside	8.54	200	DI	$ 2,990
350	Long Sault/Ingleside	23.92	200	DI	$ 8,373
351	Long Sault/Ingleside	19.45	200	DI	$ 6,807
352	Long Sault/Ingleside	7.39	200	DI	$ 2,588
353	Long Sault/Ingleside	91.96	200	DI	$ 32,186
354	Long Sault/Ingleside	5.66	200	DI	$ 1,982
355	Long Sault/Ingleside	240.71	200	DI	$ 84,247
356	Long Sault/Ingleside	16.68	200	DI	$ 5,838
357	Long Sault/Ingleside	7.46	200	DI	$ 2,612
358	Long Sault/Ingleside	7.41	200	DI	$ 2,594
362	Long Sault/Ingleside	123.18	200	DI	$ 43,114
363	Long Sault/Ingleside	5.54	200	DI	$ 1,938
383	Long Sault/Ingleside	5.24	200	DI	$ 1,835
384	Long Sault/Ingleside	160.26	200	DI	$ 56,089
385	Long Sault/Ingleside	4.21	200	DI	$ 1,474
386	Long Sault/Ingleside	2.02	200	DI	$ 706

TABLE A.10 – INVENTORY AND REPLACEMENT COST VALUATION – 200mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
387	Long Sault/Ingleside	286.45	200	DI	$ 100,257
388	Long Sault/Ingleside	231.87	200	DI	$ 81,154
428	Long Sault/Ingleside	122.06	200	DI	$ 42,723
430	Long Sault/Ingleside	3.63	200	DI	$ 1,270
431	Long Sault/Ingleside	259.13	200	DI	$ 90,697
432	Long Sault/Ingleside	1.03	200	DI	$ 360
434	Long Sault/Ingleside	97.31	200	DI	$ 34,060
435	Long Sault/Ingleside	5.18	200	DI	$ 1,813
436	Long Sault/Ingleside	1.78	200	DI	$ 623
437	Long Sault/Ingleside	6.03	200	DI	$ 2,112
438	Long Sault/Ingleside	304.57	200	DI	$ 106,599
445	Long Sault/Ingleside	1.98	200	DI	$ 691
454	Long Sault/Ingleside	346.20	200	DI	$ 121,172
477	Long Sault/Ingleside	619.68	200	DI	$ 216,887
478	Long Sault/Ingleside	8.34	200	DI	$ 2,920
479	Long Sault/Ingleside	5.31	200	DI	$ 1,859
480	Long Sault/Ingleside	6.82	200	DI	$ 2,388
495	Long Sault/Ingleside	73.38	200	DI	$ 25,684
497	Long Sault/Ingleside	136.02	200	DI	$ 47,608
498	Long Sault/Ingleside	0.25	200	DI	$ 86
499	Long Sault/Ingleside	90.44	200	DI	$ 31,655
500	Long Sault/Ingleside	4.81	200	DI	$ 1,683
501	Long Sault/Ingleside	1144.57	200	DI	$ 400,598
502	Long Sault/Ingleside	126.65	200	DI	$ 44,329
503	Long Sault/Ingleside	11.40	200	DI	$ 3,991
504	Long Sault/Ingleside	137.78	200	DI	$ 48,223
505	Long Sault/Ingleside	307.68	200	DI	$ 107,690
506	Long Sault/Ingleside	5.36	200	DI	$ 1,877
507	Long Sault/Ingleside	6.85	200	DI	$ 2,397
508	Long Sault/Ingleside	354.46	200	DI	$ 124,060
509	Long Sault/Ingleside	5.31	200	DI	$ 1,857
510	Long Sault/Ingleside	4.09	200	DI	$ 1,433
511	Long Sault/Ingleside	10.88	200	DI	$ 3,808
512	Long Sault/Ingleside	850.55	200	DI	$ 297,692
513	Long Sault/Ingleside	14.21	200	DI	$ 4,972
514	Long Sault/Ingleside	1.90	200	DI	$ 664
517	Long Sault/Ingleside	369.88	200	DI	$ 129,459
522	Long Sault/Ingleside	186.59	200	DI	$ 65,305
525	Long Sault/Ingleside	40.83	200	DI	$ 14,290
530	Long Sault/Ingleside	5.20	200	DI	$ 1,822
531	Long Sault/Ingleside	1.95	200	DI	$ 682
532	Long Sault/Ingleside	3.64	200	DI	$ 1,273
534	Long Sault/Ingleside	6.91	200	DI	$ 2,417
538	Long Sault/Ingleside	180.43	200	DI	$ 63,152
539	Long Sault/Ingleside	116.71	200	DI	$ 40,849

TABLE A.10 – INVENTORY AND REPLACEMENT COST VALUATION – 200mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
733	Long Sault/Ingleside	34.26	200	DI	$ 11,990
734	Long Sault/Ingleside	98.09	200	DI	$ 34,331
736	Long Sault/Ingleside	0.90	200	DI	$ 315
740	Long Sault/Ingleside	12.08	200	DI	$ 4,227
741	Long Sault/Ingleside	12.94	200	DI	$ 4,529
21	Eamers Corners/St.Andrews	3.74	200	PVC	$ 1,310
22	Eamers Corners/St.Andrews	30.48	200	PVC	$ 10,667
27	Eamers Corners/St.Andrews	141.49	200	PVC	$ 49,523
29	Eamers Corners/St.Andrews	149.31	200	PVC	$ 52,260
30	Eamers Corners/St.Andrews	88.24	200	PVC	$ 30,883
31	Eamers Corners/St.Andrews	4.56	200	PVC	$ 1,595
32	Eamers Corners/St.Andrews	8.90	200	PVC	$ 3,114
34	Eamers Corners/St.Andrews	90.11	200	PVC	$ 31,538
37	Eamers Corners/St.Andrews	115.14	200	PVC	$ 40,300
38	Eamers Corners/St.Andrews	6.34	200	PVC	$ 2,219
39	Eamers Corners/St.Andrews	6.69	200	PVC	$ 2,341
40	Eamers Corners/St.Andrews	6.14	200	PVC	$ 2,148
41	Eamers Corners/St.Andrews	135.73	200	PVC	$ 47,505
42	Eamers Corners/St.Andrews	124.77	200	PVC	$ 43,669
43	Eamers Corners/St.Andrews	100.76	200	PVC	$ 35,265
44	Eamers Corners/St.Andrews	106.74	200	PVC	$ 37,360
45	Eamers Corners/St.Andrews	86.43	200	PVC	$ 30,252
46	Eamers Corners/St.Andrews	151.85	200	PVC	$ 53,147
52	Eamers Corners/St.Andrews	103.89	200	PVC	$ 36,362
53	Eamers Corners/St.Andrews	98.39	200	PVC	$ 34,438
54	Eamers Corners/St.Andrews	178.54	200	PVC	$ 62,489
55	Eamers Corners/St.Andrews	123.17	200	PVC	$ 43,108
56	Eamers Corners/St.Andrews	142.68	200	PVC	$ 49,939
57	Eamers Corners/St.Andrews	7.99	200	PVC	$ 2,796
58	Eamers Corners/St.Andrews	161.19	200	PVC	$ 56,417
60	Eamers Corners/St.Andrews	89.46	200	PVC	$ 31,311
72	Eamers Corners/St.Andrews	82.90	200	PVC	$ 29,015
74	Eamers Corners/St.Andrews	126.73	200	PVC	$ 44,355
103	Eamers Corners/St.Andrews	91.12	200	PVC	$ 31,893
104	Eamers Corners/St.Andrews	2.69	200	PVC	$ 943
105	Eamers Corners/St.Andrews	117.99	200	PVC	$ 41,295
106	Eamers Corners/St.Andrews	1.35	200	PVC	$ 473
107	Eamers Corners/St.Andrews	3.53	200	PVC	$ 1,235
108	Eamers Corners/St.Andrews	101.86	200	PVC	$ 35,651
109	Eamers Corners/St.Andrews	3.58	200	PVC	$ 1,255
110	Eamers Corners/St.Andrews	4.15	200	PVC	$ 1,453
111	Eamers Corners/St.Andrews	4.22	200	PVC	$ 1,478
112	Eamers Corners/St.Andrews	113.54	200	PVC	$ 39,738
113	Eamers Corners/St.Andrews	3.48	200	PVC	$ 1,220
114	Eamers Corners/St.Andrews	94.35	200	PVC	$ 33,021

TABLE A.10 – INVENTORY AND REPLACEMENT COST VALUATION – 200mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
115	Eamers Corners/St.Andrews	142.83	200	PVC	$ 49,991
116	Eamers Corners/St.Andrews	12.24	200	PVC	$ 4,285
117	Eamers Corners/St.Andrews	6.71	200	PVC	$ 2,347
119	Eamers Corners/St.Andrews	122.93	200	PVC	$ 43,026
121	Eamers Corners/St.Andrews	125.93	200	PVC	$ 44,076
122	Eamers Corners/St.Andrews	139.29	200	PVC	$ 48,752
123	Eamers Corners/St.Andrews	2.40	200	PVC	$ 841
568	Eamers Corners/St.Andrews	2.16	200	PVC	$ 755
570	Eamers Corners/St.Andrews	3.23	200	PVC	$ 1,129
574	Eamers Corners/St.Andrews	5.40	200	PVC	$ 1,890
599	Eamers Corners/St.Andrews	13.88	200	PVC	$ 4,859
600	Eamers Corners/St.Andrews	14.68	200	PVC	$ 5,140
601	Eamers Corners/St.Andrews	6.94	200	PVC	$ 2,430
602	Eamers Corners/St.Andrews	22.88	200	PVC	$ 8,007
603	Eamers Corners/St.Andrews	20.98	200	PVC	$ 7,341
604	Eamers Corners/St.Andrews	8.09	200	PVC	$ 2,830
605	Eamers Corners/St.Andrews	61.63	200	PVC	$ 21,569
606	Eamers Corners/St.Andrews	23.06	200	PVC	$ 8,073
615	Eamers Corners/St.Andrews	7.40	200	PVC	$ 2,590
619	Eamers Corners/St.Andrews	35.86	200	PVC	$ 12,552
620	Eamers Corners/St.Andrews	126.56	200	PVC	$ 44,295
621	Eamers Corners/St.Andrews	93.42	200	PVC	$ 32,696
622	Eamers Corners/St.Andrews	19.35	200	PVC	$ 6,774
623	Eamers Corners/St.Andrews	8.13	200	PVC	$ 2,845
624	Eamers Corners/St.Andrews	135.34	200	PVC	$ 47,370
630	Eamers Corners/St.Andrews	8.57	200	PVC	$ 3,000
631	Eamers Corners/St.Andrews	137.22	200	PVC	$ 48,026
638	Eamers Corners/St.Andrews	14.77	200	PVC	$ 5,171
652	Eamers Corners/St.Andrews	134.96	200	PVC	$ 47,237
653	Eamers Corners/St.Andrews	105.57	200	PVC	$ 36,951
654	Eamers Corners/St.Andrews	61.02	200	PVC	$ 21,357
655	Eamers Corners/St.Andrews	123.36	200	PVC	$ 43,178
656	Eamers Corners/St.Andrews	140.62	200	PVC	$ 49,217
657	Eamers Corners/St.Andrews	25.40	200	PVC	$ 8,890
660	Eamers Corners/St.Andrews	11.79	200	PVC	$ 4,125
661	Eamers Corners/St.Andrews	97.45	200	PVC	$ 34,108
662	Eamers Corners/St.Andrews	120.05	200	PVC	$ 42,017
663	Eamers Corners/St.Andrews	144.78	200	PVC	$ 50,675
685	Eamers Corners/St.Andrews	51.41	200	PVC	$ 17,993
686	Eamers Corners/St.Andrews	26.09	200	PVC	$ 9,133
687	Eamers Corners/St.Andrews	97.06	200	PVC	$ 33,971
688	Eamers Corners/St.Andrews	125.03	200	PVC	$ 43,759
689	Eamers Corners/St.Andrews	7.51	200	PVC	$ 2,630
690	Eamers Corners/St.Andrews	83.99	200	PVC	$ 29,397
702	Eamers Corners/St.Andrews	13.49	200	PVC	$ 4,722

TABLE A.10 – INVENTORY AND REPLACEMENT COST VALUATION – 200mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
703	Eamers Corners/St.Andrews	84.07	200	PVC	$ 29,423
705	Eamers Corners/St.Andrews	46.93	200	PVC	$ 16,424
707	Eamers Corners/St.Andrews	7.55	200	PVC	$ 2,642
708	Eamers Corners/St.Andrews	28.49	200	PVC	$ 9,970
709	Eamers Corners/St.Andrews	81.01	200	PVC	$ 28,355
228	Long Sault/Ingleside	174.73	200	PVC	$ 61,156
229	Long Sault/Ingleside	33.13	200	PVC	$ 11,596
230	Long Sault/Ingleside	61.17	200	PVC	$ 21,409
231	Long Sault/Ingleside	1.83	200	PVC	$ 642
232	Long Sault/Ingleside	0.76	200	PVC	$ 267
233	Long Sault/Ingleside	2.40	200	PVC	$ 839
474	Long Sault/Ingleside	539.69	200	PVC	$ 188,893
482	Long Sault/Ingleside	4.65	200	PVC	$ 1,627
485	Long Sault/Ingleside	3.48	200	PVC	$ 1,217
486	Long Sault/Ingleside	11.78	200	PVC	$ 4,123
515	Long Sault/Ingleside	208.07	200	PVC	$ 72,824
516	Long Sault/Ingleside	3.25	200	PVC	$ 1,137
537	Long Sault/Ingleside	8.99	200	PVC	$ 3,145
542	Long Sault/Ingleside	145.13	200	PVC	$ 50,794
757	Long Sault/Ingleside	26.70	200	PVC	$ 9,345
TOTAL		**$ 16,409**			**$ 5,743,236**

TABLE A.11 – INVENTORY AND REPLACEMENT COST VALUATION – 250mm WATERMAIN

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
151	Long Sault/Ingleside	35.90	250	DI	$ 15,255
154	Long Sault/Ingleside	119.79	250	DI	$ 50,910
155	Long Sault/Ingleside	173.97	250	DI	$ 73,938
156	Long Sault/Ingleside	1.50	250	DI	$ 637
157	Long Sault/Ingleside	201.93	250	DI	$ 85,819
159	Long Sault/Ingleside	4.09	250	DI	$ 1,737
160	Long Sault/Ingleside	107.77	250	DI	$ 45,804
183	Long Sault/Ingleside	3.25	250	DI	$ 1,379
210	Long Sault/Ingleside	101.53	250	DI	$ 43,149
211	Long Sault/Ingleside	4.22	250	DI	$ 1,792
249	Long Sault/Ingleside	19.40	250	DI	$ 8,246
250	Long Sault/Ingleside	193.97	250	DI	$ 82,438
252	Long Sault/Ingleside	1.70	250	DI	$ 723
253	Long Sault/Ingleside	192.18	250	DI	$ 81,676
254	Long Sault/Ingleside	2.75	250	DI	$ 1,171
457	Long Sault/Ingleside	1165.55	250	DI	$ 495,361
458	Long Sault/Ingleside	11.20	250	DI	$ 4,759
459	Long Sault/Ingleside	646.81	250	DI	$ 274,892
460	Long Sault/Ingleside	568.46	250	DI	$ 241,595
471	Long Sault/Ingleside	7.17	250	DI	$ 3,046
472	Long Sault/Ingleside	6.74	250	DI	$ 2,865
473	Long Sault/Ingleside	27.30	250	DI	$ 11,604
751	Long Sault/Ingleside	47.40	250	DI	$ 20,147
752	Long Sault/Ingleside	1.11	250	DI	$ 470
543	Long Sault/Ingleside	586.61	250	PE	$ 249,308
547	Long Sault/Ingleside	0.56	250	PE	$ 239
TOTAL		**$ 4,233**			**$ 1,798,959**

TABLE A.12 – INVENTORY AND REPLACEMENT COST VALUATION – 300mm WATERMAIN

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
212	Long Sault/Ingleside	832.39	300	DI	$ 416,193
213	Long Sault/Ingleside	3.97	300	DI	$ 1,986
222	Long Sault/Ingleside	4.73	300	DI	$ 2,367
234	Long Sault/Ingleside	198.30	300	DI	$ 99,150
235	Long Sault/Ingleside	1.25	300	DI	$ 625
241	Long Sault/Ingleside	185.94	300	DI	$ 92,971
242	Long Sault/Ingleside	249.53	300	DI	$ 124,764
243	Long Sault/Ingleside	1.11	300	DI	$ 557
244	Long Sault/Ingleside	331.54	300	DI	$ 165,770
245	Long Sault/Ingleside	1.50	300	DI	$ 749
246	Long Sault/Ingleside	1.82	300	DI	$ 911
251	Long Sault/Ingleside	5.19	300	DI	$ 2,595
13	Eamers Corners/St.Andrews	22.47	300	PVC	$ 11,233
79	Eamers Corners/St.Andrews	5.21	300	PVC	$ 2,607
80	Eamers Corners/St.Andrews	164.87	300	PVC	$ 82,434
81	Eamers Corners/St.Andrews	5.02	300	PVC	$ 2,512
82	Eamers Corners/St.Andrews	146.98	300	PVC	$ 73,488
83	Eamers Corners/St.Andrews	2.02	300	PVC	$ 1,010
84	Eamers Corners/St.Andrews	2.49	300	PVC	$ 1,246
85	Eamers Corners/St.Andrews	149.54	300	PVC	$ 74,771
86	Eamers Corners/St.Andrews	1.23	300	PVC	$ 616
87	Eamers Corners/St.Andrews	3.14	300	PVC	$ 1,571
88	Eamers Corners/St.Andrews	148.68	300	PVC	$ 74,342
89	Eamers Corners/St.Andrews	1.71	300	PVC	$ 856
90	Eamers Corners/St.Andrews	2.72	300	PVC	$ 1,361
91	Eamers Corners/St.Andrews	143.22	300	PVC	$ 71,610
92	Eamers Corners/St.Andrews	4.08	300	PVC	$ 2,041
93	Eamers Corners/St.Andrews	5.56	300	PVC	$ 2,779
94	Eamers Corners/St.Andrews	3.85	300	PVC	$ 1,924
95	Eamers Corners/St.Andrews	2.41	300	PVC	$ 1,205
96	Eamers Corners/St.Andrews	150.06	300	PVC	$ 75,032
97	Eamers Corners/St.Andrews	155.49	300	PVC	$ 77,746
98	Eamers Corners/St.Andrews	2.56	300	PVC	$ 1,281
99	Eamers Corners/St.Andrews	2.80	300	PVC	$ 1,400
100	Eamers Corners/St.Andrews	119.99	300	PVC	$ 59,997
101	Eamers Corners/St.Andrews	3.42	300	PVC	$ 1,711
102	Eamers Corners/St.Andrews	9.93	300	PVC	$ 4,964
118	Eamers Corners/St.Andrews	116.98	300	PVC	$ 58,492
120	Eamers Corners/St.Andrews	54.59	300	PVC	$ 27,294
127	Eamers Corners/St.Andrews	180.96	300	PVC	$ 90,481
128	Eamers Corners/St.Andrews	19.13	300	PVC	$ 9,567
566	Eamers Corners/St.Andrews	5.19	300	PVC	$ 2,597
567	Eamers Corners/St.Andrews	19.36	300	PVC	$ 9,679
571	Eamers Corners/St.Andrews	120.57	300	PVC	$ 60,284
572	Eamers Corners/St.Andrews	1.10	300	PVC	$ 548

TABLE A.12 – INVENTORY AND REPLACEMENT COST VALUATION – 300mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
658	Eamers Corners/St.Andrews	92.43	300	PVC	$ 46,215
659	Eamers Corners/St.Andrews	72.75	300	PVC	$ 36,374
674	Eamers Corners/St.Andrews	146.84	300	PVC	$ 73,422
675	Eamers Corners/St.Andrews	145.74	300	PVC	$ 72,872
676	Eamers Corners/St.Andrews	149.93	300	PVC	$ 74,966
677	Eamers Corners/St.Andrews	127.20	300	PVC	$ 63,600
678	Eamers Corners/St.Andrews	150.76	300	PVC	$ 75,379
679	Eamers Corners/St.Andrews	125.71	300	PVC	$ 62,853
680	Eamers Corners/St.Andrews	136.31	300	PVC	$ 68,154
681	Eamers Corners/St.Andrews	140.91	300	PVC	$ 70,454
682	Eamers Corners/St.Andrews	15.03	300	PVC	$ 7,517
683	Eamers Corners/St.Andrews	66.29	300	PVC	$ 33,145
684	Eamers Corners/St.Andrews	56.94	300	PVC	$ 28,468
739	Eamers Corners/St.Andrews	1.73	300	PVC	$ 864
TOTAL		**$ 5,023**			**$ 2,511,598**

TABLE A.13 – INVENTORY AND REPLACEMENT COST VALUATION – 400mm WATERMAIN

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
303	Long Sault/Ingleside	1425.01	400	DI	$ 819,382
304	Long Sault/Ingleside	2.68	400	DI	$ 1,541
305	Long Sault/Ingleside	6.89	400	DI	$ 3,960
306	Long Sault/Ingleside	3.64	400	DI	$ 2,093
307	Long Sault/Ingleside	3.79	400	DI	$ 2,179
308	Long Sault/Ingleside	5.80	400	DI	$ 3,333
309	Long Sault/Ingleside	3.56	400	DI	$ 2,045
310	Long Sault/Ingleside	0.95	400	DI	$ 544
311	Long Sault/Ingleside	4.33	400	DI	$ 2,490
312	Long Sault/Ingleside	3.01	400	DI	$ 1,730
313	Long Sault/Ingleside	3.64	400	DI	$ 2,096
314	Long Sault/Ingleside	4.32	400	DI	$ 2,482
315	Long Sault/Ingleside	2.70	400	DI	$ 1,554
316	Long Sault/Ingleside	4.39	400	DI	$ 2,525
317	Long Sault/Ingleside	4.49	400	DI	$ 2,582
318	Long Sault/Ingleside	8.57	400	DI	$ 4,925
319	Long Sault/Ingleside	4.54	400	DI	$ 2,609
320	Long Sault/Ingleside	11.92	400	DI	$ 6,854
321	Long Sault/Ingleside	4.64	400	DI	$ 2,667
322	Long Sault/Ingleside	1.64	400	DI	$ 946
323	Long Sault/Ingleside	3.59	400	DI	$ 2,064
546	Long Sault/Ingleside	192.67	400	DI	$ 110,787
710	Long Sault/Ingleside	5.81	400	DI	$ 3,338
711	Long Sault/Ingleside	787.96	400	DI	$ 453,077
712	Long Sault/Ingleside	3.30	400	DI	$ 1,896

TABLE A.13 – INVENTORY AND REPLACEMENT COST VALUATION – 400mm WATERMAIN (cont.)

Asset ID	Location	Length (m)	Diameter (mm)	Material	Replacement Cost
713	Long Sault/Ingleside	321.74	400	DI	$ 185,003
714	Long Sault/Ingleside	220.30	400	DI	$ 126,673
715	Long Sault/Ingleside	388.41	400	DI	$ 223,335
716	Long Sault/Ingleside	166.45	400	DI	$ 95,707
717	Long Sault/Ingleside	89.06	400	DI	$ 51,212
718	Long Sault/Ingleside	491.11	400	DI	$ 282,390
719	Long Sault/Ingleside	314.76	400	DI	$ 180,987
720	Long Sault/Ingleside	464.67	400	DI	$ 267,183
721	Long Sault/Ingleside	729.81	400	DI	$ 419,640
722	Long Sault/Ingleside	644.29	400	DI	$ 370,467
723	Long Sault/Ingleside	480.99	400	DI	$ 276,571
724	Long Sault/Ingleside	149.36	400	DI	$ 85,885
725	Long Sault/Ingleside	1.19	400	DI	$ 685
726	Long Sault/Ingleside	586.96	400	DI	$ 337,500
727	Long Sault/Ingleside	37.82	400	DI	$ 21,747
728	Long Sault/Ingleside	1374.76	400	DI	$ 790,489
729	Long Sault/Ingleside	176.77	400	DI	$ 101,641
730	Long Sault/Ingleside	8.30	400	DI	$ 4,770
731	Long Sault/Ingleside	369.72	400	DI	$ 212,591
732	Long Sault/Ingleside	195.66	400	DI	$ 112,504
753	Long Sault/Ingleside	18.03	400	DI	$ 10,368
2	Eamers Corners/St.Andrews	267.11	400	PVC	$ 153,586
3	Eamers Corners/St.Andrews	92.46	400	PVC	$ 53,166
4	Eamers Corners/St.Andrews	144.54	400	PVC	$ 83,110
5	Eamers Corners/St.Andrews	127.29	400	PVC	$ 73,190
6	Eamers Corners/St.Andrews	108.62	400	PVC	$ 62,458
7	Eamers Corners/St.Andrews	198.83	400	PVC	$ 114,325
8	Eamers Corners/St.Andrews	242.07	400	PVC	$ 139,192
9	Eamers Corners/St.Andrews	220.92	400	PVC	$ 127,032
10	Eamers Corners/St.Andrews	140.83	400	PVC	$ 80,977
11	Eamers Corners/St.Andrews	240.88	400	PVC	$ 138,508
12	Eamers Corners/St.Andrews	146.97	400	PVC	$ 84,508
648	Eamers Corners/St.Andrews	78.91	400	PVC	$ 45,374
651	Eamers Corners/St.Andrews	23.52	400	PVC	$ 13,527
673	Eamers Corners/St.Andrews	11.12	400	PVC	$ 6,393
540	Long Sault/Ingleside	1879.18	400	PVC	$ 1,080,529
TOTAL		**$ 13,657**			**$ 7,852,921**

TABLE A.14 – INVENTORY AND REPLACEMENT COST VALUATION – HYDRANTS AND WATER VALVES

Location	Quantity	Replacement Cost
HYDRANTS		
Ingleside	93	$ 582,180
Long Sault	138	$ 863,880
Newington	2	$ 12,520
Rosedale Terrace	80	$ 500,800
St. Andrews	57	$ 356,820
TOTAL HYDRANTS	**370**	**$ 2,316,200**
VALVES		
Ingleside	105	$ 418,425
Long Sault	105	$ 418,425
Newington	19	$ 75,715
Rosedale Terrace	129	$ 514,065
St. Andrews	61	$ 243,085
TOTAL VALVES	**419**	**$ 1,669,715**

TABLE A.15 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm-200mm SANITARY SEWERS

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
104	Ingleside	Dickinson Rd	168.16	150	PVC	$ 50,448
105	Ingleside	Dickinson Rd	55.71	150	PVC	$ 16,712
3	Ingleside	Napier St.	107.55	200	PVC	$ 32,266
4	Ingleside	St Lawrence St.	47.94	200	PVC	$ 14,383
5	Ingleside	Piercy St.	73.79	200	CONC	$ 22,136
6	Ingleside	Piercy St.	71.17	200	CONC	$ 21,352
7	Ingleside	Piercy St.	70.95	200	CONC	$ 21,286
8	Ingleside	Piercy St.	64.12	200	CONC	$ 19,237
9	Ingleside	Piercy St.	64.78	200	CONC	$ 19,435
10	Ingleside	St Lawrence St.	88.10	200	PVC	$ 26,429
11	Ingleside	St Lawrence St.	48.71	200	PVC	$ 14,614
12	Ingleside	St Lawrence St.	67.32	200	PVC	$ 20,196
13	Ingleside	St Lawrence St.	62.53	200	PVC	$ 18,760
14	Ingleside	St Lawrence St.	86.97	200	PVC	$ 26,091
16	Ingleside	St Lawrence St.	115.65	200	PVC	$ 34,694
32	Ingleside	St Lawrence St.	114.69	200	PVC	$ 34,408
43	Ingleside	Woodlands Dr.	98.21	200	PVC	$ 29,464
44	Ingleside	Woodlands Dr.	92.07	200	PVC	$ 27,620
45	Ingleside	Santa Cruz Dr.	75.37	200	VC	$ 22,610
46	Ingleside	Santa Cruz Dr.	118.60	200	VC	$ 35,580
47	Ingleside	Santa Cruz Dr.	104.29	200	VC	$ 31,286
48	Ingleside	Santa Cruz Dr.	104.96	200	VC	$ 31,488
49	Ingleside	Santa Cruz Dr.	102.74	200	VC	$ 30,823
50	Ingleside	Santa Cruz Dr.	114.62	200	VC	$ 34,386
51	Ingleside	Wales Dr.	111.22	200	VC	$ 33,366
52	Ingleside	Wales Dr.	110.88	200	VC	$ 33,265
53	Ingleside	Wales Dr.	110.17	200	VC	$ 33,052
54	Ingleside	Wales Dr.	129.63	200	VC	$ 38,889
55	Ingleside	Hoople St.	96.32	200	AC	$ 28,896
56	Ingleside	Hoople St.	98.17	200	AC	$ 29,450
57	Ingleside	Hoople St.	102.94	200	AC	$ 30,881
58	Ingleside	Hoople St.	94.97	200	AC	$ 28,492
59	Ingleside	Hoople St.	109.41	200	AC	$ 32,822
60	Ingleside	Elm St.	104.32	200	VCT	$ 31,296
61	Ingleside	Elm St.	105.57	200	VCT	$ 31,672
62	Ingleside	Elm St.	100.00	200	VCT	$ 30,001
63	Ingleside	Elm St.	100.48	200	VC	$ 30,145
64	Ingleside	Elm St.	120.99	200	VC	$ 36,296
65	Ingleside	Maxwell Ave.	108.19	200	VC	$ 32,458
66	Ingleside	Maxwell Ave.	108.80	200	VC	$ 32,639
67	Ingleside	Maxwell Ave.	109.25	200	VC	$ 32,775
68	Ingleside	Maxwell Ave.	95.97	200	VC	$ 28,791
69	Ingleside	Maxwell Ave.	107.79	200	VC	$ 32,338
73	Ingleside	Maple St.	99.23	200	VC	$ 29,769
74	Ingleside	Maple St.	98.66	200	VC	$ 29,599
75	Ingleside	Maple St.	83.23	200	VC	$ 24,969
76	Ingleside	Maple St.	83.91	200	VC	$ 25,174
77	Ingleside	Maple St.	59.50	200	VC	$ 17,850
78	Ingleside	Maple St.	21.15	200	VC	$ 6,344
79	Ingleside	Maple St.	27.03	200	VC	$ 8,108

TABLE A.15 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm-200mm SANITARY SEWERS (cont.)

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
80	Ingleside	Maple St.	92.10	200	VC	$ 27,631
81	Ingleside	Dickinson	17.87	200	VC	$ 5,361
82	Ingleside	Maple St.	95.44	200	VC	$ 28,631
83	Ingleside	Maple St.	109.14	200	VC	$ 32,743
84	Ingleside	Maple St.	98.22	200	VC	$ 29,467
85	Ingleside	Maple St.	97.74	200	VC	$ 29,322
86	Ingleside	Maple St.	98.39	200	VC	$ 29,518
90	Ingleside	Industrial Dr.	132.66	200	PVC	$ 39,798
91	Ingleside	Industrial Dr.	134.63	200	PVC	$ 40,388
111	Ingleside	College St.	109.56	200	VC	$ 32,867
112	Ingleside	College St.	62.94	200	VC	$ 18,882
113	Ingleside	College St.	94.06	200	VC	$ 28,218
114	Ingleside	College St.	77.95	200	VC	$ 23,384
115	Ingleside	College St.	43.39	200	VC	$ 13,017
116	Ingleside	Dickinson	10.69	200	VC	$ 3,207
117	Ingleside	Memorial Sq.	80.08	200	VC	$ 24,023
118	Ingleside	Memorial Sq.	88.49	200	VC	$ 26,546
119	Ingleside	Memorial Sq.	78.42	200	VC	$ 23,525
120	Ingleside		11.79	200	VC	$ 3,536
121	Ingleside	Maple St.	43.43	200	VC	$ 13,028
122	Ingleside	Maple St.	73.63	200	VC	$ 22,090
123	Ingleside	Maple St.	74.03	200	VC	$ 22,210
124	Ingleside	Maple St.	52.91	200	VC	$ 15,874
126	Ingleside	Pine St.	118.78	200	VC	$ 35,633
127	Ingleside	Pine St.	95.37	200	VC	$ 28,612
128	Ingleside	Pine St.	95.02	200	VC	$ 28,507
129	Ingleside	Pine St.	106.85	200	VC	$ 32,056
130	Ingleside	Pine St.	75.21	200	VC	$ 22,564
131	Ingleside	Pine St.	76.13	200	VC	$ 22,840
132	Ingleside	Pine St.	72.74	200	VC	$ 21,823
133	Ingleside	Pine St.	73.40	200	VC	$ 22,021
134	Ingleside	Ault Dr.	110.96	200	PVC	$ 33,288
135	Ingleside	Ault Dr.	110.09	200	PVC	$ 33,026
136	Ingleside	Ault Dr.	111.57	200	PVC	$ 33,471
137	Ingleside		4.37	200	PVC	$ 1,311
138	Ingleside	Ault Dr.	46.38	200	PVC	$ 13,913
139	Ingleside		2.68	200	PVC	$ 804
140	Ingleside	Ault Dr.	99.84	200	PVC	$ 29,953
141	Ingleside	Wildwood Dr.	127.34	200	PVC	$ 38,201
142	Ingleside	Cypress	95.45	200	PVC	$ 28,634
143	Ingleside	Cypress	90.23	200	PVC	$ 27,068
144	Ingleside	Cypress	97.19	200	PVC	$ 29,156
145	Ingleside		4.65	200	PVC	$ 1,395
146	Ingleside	Hickory St.	109.00	200	PVC	$ 32,701
147	Ingleside	Hickory St.	104.67	200	PVC	$ 31,400
148	Ingleside	Hickory St.	56.43	200	PVC	$ 16,929
149	Ingleside	Hickory St.	89.76	200	PVC	$ 26,927
150	Ingleside		4.33	200	PVC	$ 1,299
151	Ingleside	Hickory St.	64.51	200	PVC	$ 19,354
152	Ingleside		16.20	200	PVC	$ 4,859

TABLE A.15 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm-200mm SANITARY SEWERS (cont.)

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
153	Ingleside	Hickory St.	49.95	200	PVC	$ 14,986
154	Ingleside		78.10	200	AC	$ 23,429
155	Ingleside	Hickory St.	110.68	200	AC	$ 33,203
156	Ingleside	Hickory St.	107.63	200	AC	$ 32,289
157	Ingleside	Hickory St.	112.65	200	AC	$ 33,796
158	Ingleside	Spruce St.	86.74	200	AC	$ 26,022
159	Ingleside	Spruce St.	85.76	200	AC	$ 25,727
160	Ingleside	Spruce St.	68.76	200	AC	$ 20,627
161	Ingleside	Spruce St.	119.99	200	AC	$ 35,998
172	Long Sault	Strachan Ave.	129.05	200	PVC	$ 38,715
251	Long Sault		45.03	200	PVC	$ 13,509
252	Long Sault		8.35	200	PVC	$ 2,505
253	Long Sault	Cherry Ave.	81.97	200	PVC SDR 35	$ 24,591
254	Long Sault		10.73	200	PVC SDR 35	$ 3,220
255	Long Sault		14.65	200	PVC SDR 35	$ 4,394
256	Long Sault	Cherry Ave.	106.42	200	PVC	$ 31,926
257	Long Sault	Cherry Ave.	78.76	200	PVC SDR 35	$ 23,629
258	Long Sault	Cherry Ave.	91.87	200	PVC SDR 35	$ 27,561
259	Long Sault	Cherry Ouellette	144.40	200	PVC SDR 35	$ 43,321
260	Long Sault	Milles Roches Rd.	73.41	200	PVC	$ 22,024
272	Long Sault		71.79	200	PVC	$ 21,538
273	Long Sault		1.95	200	PVC	$ 584
274	Long Sault	Plaza St.	35.92	200	PVC	$ 10,776
275	Long Sault	Plaza St.	39.24	200	PVC	$ 11,773
277	Long Sault	Long Sault Rd.	38.05	200	PVC	$ 11,414
279	Long Sault	Long Sault Rd.	23.31	200	PVC	$ 6,992
280	Long Sault	Long Sault Rd.	45.27	200	PVC	$ 13,581
281	Long Sault		6.31	200	PVC	$ 1,893
282	Long Sault		36.38	200	PVC	$ 10,913
286	Long Sault	Barnhart Dr.	118.31	200	PVC	$ 35,493
287	Long Sault	Walner Ave.	64.88	200	PVC	$ 19,464
288	Long Sault	Barnhart Dr.	76.58	200	PVC	$ 22,975
289	Long Sault	Barnhart Dr.	108.32	200	PVC	$ 32,495
290	Long Sault	Barnhart Dr.	67.07	200	PVC	$ 20,122
291	Long Sault	Barnhart Dr.	9.43	200	PVC	$ 2,828
292	Long Sault		117.37	200	PVC	$ 35,212
293	Long Sault		113.65	200	PVC	$ 34,095
294	Long Sault		115.58	200	PVC	$ 34,674
295	Long Sault	Chantine Dr.	120.46	200	PVC	$ 36,139
296	Long Sault	Chantine Dr.	120.42	200	PVC	$ 36,127
297	Long Sault	Chantine Dr.	111.94	200	PVC	$ 33,583
298	Long Sault	Chantine Dr.	104.91	200	PVC	$ 31,474
299	Long Sault	Chantine Dr. Easement	110.17	200	PVC	$ 33,050
300	Long Sault	Chantine Dr. Easement	109.41	200	PVC	$ 32,823
301	Long Sault	Chantine Dr. Easement	80.66	200	PVC	$ 24,198
302	Long Sault		33.33	200	PVC	$ 9,999
303	Long Sault		129.94	200	PVC	$ 38,983
304	Long Sault		156.27	200	PVC	$ 46,882
305	Long Sault		99.79	200	PVC	$ 29,937
312	Long Sault	Forest Hill Dr.	76.34	200	PVC	$ 22,902

TABLE A.15 – INVENTORY AND REPLACEMENT COST VALUATION – 150mm-200mm SANITARY SEWERS (cont.)

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
313	Long Sault	Forest Hill Dr.	91.09	200	PVC	$ 27,327
314	Long Sault	Forest Hill Dr.	140.51	200	PVC	$ 42,154
315	Long Sault	Forest Hill Dr.	38.43	200	PVC	$ 11,530
316	Long Sault	Forest Hill Dr.	41.73	200	PVC	$ 12,520
317	Long Sault	Forest Hill Dr.	107.89	200	PVC	$ 32,367
318	Long Sault	Forest Hill Dr.	120.16	200	PVC	$ 36,049
319	Long Sault	Forest Hill Dr.	120.95	200	PVC	$ 36,284
320	Long Sault	Forest Hill Dr.	35.06	200	PVC	$ 10,519
322	Long Sault		352.28	200	PVC	$ 105,685
TOTAL			**13449.58**			**$ 4,034,875**

TABLE A.16 – INVENTORY AND REPLACEMENT COST VALUATION – 250mm SANITARY SEWERS

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
31	Ingleside	St Lawrence St.	115.08	250	AC	$ 40,277
33	Ingleside	St Lawrence St.	102.11	250	AC	$ 35,738
34	Ingleside	St Lawrence St.	101.85	250	AC	$ 35,648
35	Ingleside	St Lawrence St.	101.91	250	AC	$ 35,670
36	Ingleside	St Lawrence St.	101.12	250	AC	$ 35,391
70	Ingleside	Dickinson	112.08	250	AC	$ 39,230
71	Ingleside	Dickinson	117.53	250	AC	$ 41,135
106	Ingleside	Dickinson	60.77	250	PVC	$ 21,269
107	Ingleside	Dickinson	120.68	250	AC	$ 42,240
108	Ingleside	Dickinson	83.52	250	AC	$ 29,233
109	Ingleside	Dickinson	18.94	250	AC	$ 6,628
110	Ingleside	Dickinson	107.71	250	AC	$ 37,697
168	Long Sault		87.51	250	AC	$ 30,628
169	Long Sault		88.08	250	AC	$ 30,827
170	Long Sault		22.91	250	AC	$ 8,020
171	Long Sault		94.86	250	AC	$ 33,200
173	Long Sault	Strachan Ave.	21.87	250	VC	$ 7,654
174	Long Sault	Strachan Ave.	9.21	250	VC	$ 3,223
175	Long Sault	Strachan Ave.	88.07	250	VC	$ 30,824
176	Long Sault	Strachan Ave.	94.84	250	VC	$ 33,196
177	Long Sault	Strachan Ave.	88.25	250	VC	$ 30,888
188	Long Sault	Manning Rd.	71.69	250	AC	$ 25,093
189	Long Sault	Manning Rd.	11.47	250	AC	$ 4,013
190	Long Sault	Simcoe St.	89.98	250	VC	$ 31,493
191	Long Sault	Simcoe St.	91.61	250	VC	$ 32,063
192	Long Sault	Simcoe St.	37.45	250	VC	$ 13,107
193	Long Sault	Simcoe St.	53.94	250	VC	$ 18,881
194	Long Sault	Simcoe St.	45.10	250	VC	$ 15,787
195	Long Sault	Simcoe St.	63.50	250	VC	$ 22,226
196	Long Sault	Simcoe St.	90.59	250	VC	$ 31,708
197	Long Sault	Milles Roches Rd.	104.38	250	VC	$ 36,534
198	Long Sault	Milles Roches Rd.	87.11	250	VC	$ 30,490
199	Long Sault		96.66	250	VC	$ 33,830
200	Long Sault	Bethune Ave.	95.74	250	VC	$ 33,508
201	Long Sault	Bethune Ave.	97.24	250	VC	$ 34,035

TABLE A.16 – INVENTORY AND REPLACEMENT COST VALUATION – 250mm SANITARY SEWERS (cont.)

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
202	Long Sault	Bethune Ave.	88.65	250	VC	$ 31,027
203	Long Sault	Bethune Ave.	90.66	250	VC	$ 31,731
204	Long Sault	Adam Dixon Ave.	211.79	250	VCT	$ 74,128
205	Long Sault	Bethune Ave.	57.24	250	VC	$ 20,034
206	Long Sault	Bethune Ave.	88.01	250	VC	$ 30,803
207	Long Sault	Kent Cr.	97.23	250	VC	$ 34,029
208	Long Sault	Kent Cr.	81.68	250	VC	$ 28,587
209	Long Sault	Kent Cr.	89.36	250	VC	$ 31,275
210	Long Sault	Kent Cr.	94.69	250	VC	$ 33,142
211	Long Sault	Kent Cr.	90.16	250	VC	$ 31,557
221	Long Sault	Frost Ave.	105.55	250	VC	$ 36,941
222	Long Sault	Frost Ave.	103.28	250	VC	$ 36,147
223	Long Sault	Frost Ave.	103.26	250	VC	$ 36,143
224	Long Sault	Frost Ave.	91.19	250	VC	$ 31,917
225	Long Sault	Saunders Ave.	44.01	250	VC	$ 15,402
226	Long Sault	Saunders Ave.	91.56	250	VC	$ 32,047
227	Long Sault	Saunders Ave.	92.52	250	VC	$ 32,381
228	Long Sault	Saunders Ave.	73.09	250	VC	$ 25,582
229	Long Sault		12.30	250	VC	$ 4,304
230	Long Sault	St. Laurent Ave.	63.14	250	PVC	$ 22,100
231	Long Sault	St. Laurent Ave.	87.92	250	VC	$ 30,770
232	Long Sault	St. Laurent Ave.	94.76	250	VC	$ 33,166
233	Long Sault	St. Laurent Ave.	97.17	250	VC	$ 34,011
234	Long Sault	St. Laurent Ave.	84.91	250	VC	$ 29,718
235	Long Sault	Saunders Ave.	52.53	250	VC	$ 18,385
236	Long Sault	Saunders Ave.	82.67	250	VC	$ 28,936
237	Long Sault	Saunders Ave.	100.34	250	VC	$ 35,117
238	Long Sault	Saunders Ave.	60.10	250	VC	$ 21,034
239	Long Sault	Saunders Ave.	56.53	250	VC	$ 19,785
242	Long Sault	Saunders Ave.	30.11	250	PVC	$ 10,538
244	Long Sault	Cherry Ouellette	64.89	250	AC	$ 22,711
245	Long Sault		111.91	250	PVC SDR 35	$ 39,167
246	Long Sault		106.42	250	PVC	$ 37,248
247	Long Sault		6.38	250	AC	$ 2,233
248	Long Sault	Ouellette Ave.	110.18	250	AC	$ 38,564
249	Long Sault	Ouellette Ave.	108.68	250	AC	$ 38,038
250	Long Sault	Ouellette Ave.	91.40	250	AC	$ 31,989
261	Long Sault		102.61	250	VC	$ 35,913
262	Long Sault	Johnson Cr.	96.87	250	VC	$ 33,905
263	Long Sault	Johnson Cr.	88.41	250	VC	$ 30,944
264	Long Sault	Johnson Cr.	65.98	250	VC	$ 23,094
265	Long Sault	Grey Ave.	131.44	250	VC	$ 46,004
266	Long Sault		106.15	250	VC	$ 37,151
267	Long Sault	Johnson Cr.	93.88	250	VC	$ 32,858
268	Long Sault	Johnson Cr.	89.30	250	VC	$ 31,255
269	Long Sault	Johnson Cr.	83.24	250	VC	$ 29,133
270	Long Sault	Johnson Cr.	9.02	250	VC	$ 3,157
271	Long Sault		96.79	250	VC	$ 33,878
276	Long Sault	Long Sault Rd.	153.88	250	PVC	$ 53,858
278	Long Sault		23.88	250	PVC	$ 8,357

TABLE A.16 – INVENTORY AND REPLACEMENT COST VALUATION – 250mm SANITARY SEWERS (cont.)

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
283	Long Sault	Long Sault Rd.	80.09	250	PVC	$ 28,033
306	Long Sault		115.31	250	AC	$ 40,357
307	Long Sault		107.61	250	AC	$ 37,664
308	Long Sault		105.57	250	AC	$ 36,951
309	Long Sault		36.25	250	AC	$ 12,688
310	Long Sault		66.27	250	AC	$ 23,194
321	Long Sault		95.98	250	CONC	$ 33,594
323	Long Sault	Fickes Rd.	66.62	250	CONC	$ 23,317
324	Long Sault		175.86	250	PVC	$ 61,551
325	Long Sault		154.75	250	AC	$ 54,163
326	Long Sault	St. Laurent Ave.	39.17	250	PVC	$ 13,710
327	Long Sault		67.55	250	CONC	$ 23,642
328	Long Sault		210.76	250	CONC	$ 73,768
329	Long Sault		89.26	250	CONC	$ 31,241
330	Long Sault		91.50	250	CONC	$ 32,026
331	Long Sault	Country Rd. 36	221.20	250	PVC	$ 77,421
332	Long Sault	Country Rd. 36	104.88	250	PVC	$ 36,708
333	Long Sault	Country Rd. 36	211.14	250	PVC	$ 73,899
334	Long Sault	Country Rd. 36	110.72	250	PVC	$ 38,751
335	Long Sault	Country Rd. 36	111.16	250	PVC	$ 38,907
336	Long Sault		114.64	250	CONC	$ 40,125
337	Long Sault		105.08	250	CONC	$ 36,779
338	Long Sault	Country Rd. 36	111.08	250	PVC	$ 38,876
TOTAL			**9625.55**			**$ 3,368,943**

TABLE A.17 – INVENTORY AND REPLACEMENT COST VALUATION – 300mm-450mm SANITARY SEWERS

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
39	Ingleside	St Lawrence St.	94.95	300	AC	$ 37,980
40	Ingleside	St Lawrence St.	95.44	300	AC	$ 38,174
41	Ingleside	St Lawrence St.	201.13	300	AC	$ 80,453
72	Ingleside		27.90	300	AC	$ 11,159
125	Ingleside		91.16	300	AC	$ 36,462
178	Long Sault	Strachan Ave.	10.17	300	PVC	$ 4,067
179	Long Sault	Strachan Easement	54.71	300	PVC	$ 21,883
42	Ingleside		209.26	350	AC	$ 78,473
212	Long Sault	Milles Roches Rd.	38.90	375	VC	$ 14,586
213	Long Sault	Milles Roches Rd.	106.20	375	VC	$ 39,825
214	Long Sault	Milles Roches Rd.	86.12	375	VC	$ 32,296
215	Long Sault	Milles Roches Rd.	90.93	375	VC	$ 34,100
216	Long Sault	Milles Roches Rd.	91.42	375	VC	$ 34,281
217	Long Sault	Milles Roches Rd.	89.03	375	VC	$ 33,388
218	Long Sault	Milles Roches Rd.	92.95	375	VC	$ 34,858
219	Long Sault	Milles Roches Rd.	86.80	375	VC	$ 32,551
220	Long Sault	Frost Ave.	94.92	375	VC	$ 35,594
284	Long Sault	Milles Roches Easement	55.11	375	VC	$ 20,668
1	Ingleside	Napier St.	109.99	450	PVC	$ 46,746
2	Ingleside	Napier St.	117.75	450	PVC	$ 50,042
TOTAL			**1844.84**			**$ 717,587**

TABLE A.18 – INVENTORY AND REPLACEMENT COST VALUATION – 525mm-600mm SANITARY SEWERS

Asset ID	Location	Street	Length (m)	Diameter (mm)	Material	Replacement Cost
37	Ingleside		71.70	525	AC	$ 34,056
87	Ingleside		111.39	525	CONC	$ 52,909
88	Ingleside		112.63	525	CONC	$ 53,501
89	Ingleside		109.69	525	CONC	$ 52,104
92	Ingleside		102.45	525	CONC	$ 48,662
93	Ingleside		118.38	525	CONC	$ 56,230
94	Ingleside		119.18	525	CONC	$ 56,611
95	Ingleside		112.80	525	CONC	$ 53,578
96	Ingleside		111.32	525	CONC	$ 52,878
97	Ingleside		60.93	525	CONC	$ 28,944
98	Ingleside		100.52	525	CONC	$ 47,748
99	Ingleside		63.89	525	CONC	$ 30,346
100	Ingleside		205.87	525	CONC	$ 97,787
101	Ingleside		106.05	525	CONC	$ 50,372
102	Ingleside		22.95	525	CONC	$ 10,903
103	Ingleside		83.04	525	CONC	$ 39,443
180	Long Sault	Saunders-Simcoe Easement	104.43	525	PVC	$ 49,603
181	Long Sault	Saunders-Simcoe Easement	105.50	525	PVC	$ 50,113
182	Long Sault	Saunders-Simcoe Easement	107.06	525	PVC	$ 50,852
183	Long Sault	Saunders-Simcoe Easement	68.31	525	PVC	$ 32,448
184	Long Sault	Saunders-Simcoe Easement	97.18	525	PVC	$ 46,162
185	Long Sault	Saunders-Simcoe Easement	85.10	525	PVC	$ 40,421
186	Long Sault	Saunders-Simcoe Easement	84.84	525	PVC	$ 40,300
240	Long Sault	Cherry Ouellette	43.47	525	PVC SDR 35	$ 20,649
241	Long Sault	Cherry Ouellette	43.08	525	PVC SDR 35	$ 20,462
243	Long Sault	Saunders-Simcoe Easement	103.80	525	PVC	$ 49,303
285	Long Sault		130.13	525	PVC	$ 61,809
15	Ingleside	Killarney St.	60.13	600	AC	$ 31,569
17	Ingleside		89.63	600	AC	$ 47,054
18	Ingleside		82.63	600	AC	$ 43,378
19	Ingleside		89.92	600	AC	$ 47,209
20	Ingleside		65.57	600	AC	$ 34,423
21	Ingleside		100.67	600	AC	$ 52,853
22	Ingleside		98.90	600	AC	$ 51,922
23	Ingleside		94.58	600	AC	$ 49,654
24	Ingleside		93.67	600	AC	$ 49,174
25	Ingleside		87.01	600	AC	$ 45,683
26	Ingleside		67.29	600	AC	$ 35,330
27	Ingleside		86.07	600	AC	$ 45,188
28	Ingleside		86.33	600	AC	$ 45,323
29	Ingleside		104.90	600	AC	$ 55,071
30	Ingleside		12.72	600	AC	$ 6,680
38	Ingleside		153.55	600	AC	$ 80,616
162	Long Sault		25.62	600	CONC	$ 13,449
163	Long Sault		4.22	600	CONC	$ 2,217
164	Long Sault	Robin Rd.	200.66	600	CONC	$ 105,349
165	Long Sault		8.98	600	CONC	$ 4,716
166	Long Sault	Country Rd. 2	77.80	600	PE	$ 40,846
167	Long Sault	Country Rd. 2	79.08	600	PE	$ 41,517
187	Long Sault	Saunders-Simcoe Easement	103.07	600	CONC	$ 54,110
339	Long Sault	Country Rd. 2	67.22	600	CONC	$ 35,289
340	Long Sault	Country Rd. 2	28.69	600	CONC	$ 15,063
TOTAL			**4554.60**			**$ 2,261,880**

TABLE A.19 – INVENTORY AND REPLACEMENT COST VALUATION – SANITARY MANHOLES

Size (mm)	Quantity	Replacement Cost
INGLESIDE		
600	3	$ 14,775
800	4	$ 19,700
900	98	$ 482,650
1000	10	$ 49,250
1100	14	$ 68,950
1200	34	$ 167,450
1800	1	$ 11,675
Total	**164**	**$ 814,450**
LONG SAULT		
600	6	$ 29,550
800	10	$ 49,250
900	70	$ 344,750
1000	4	$ 19,700
1200	113	$ 556,525
1800	2	$ 23,350
Total	**205**	**$ 1,023,125**

TABLE A.20 – INVENTORY AND REPLACEMENT COST VALUATION – WATER AND SEWAGE TREATMENT PLANTS

ASSET ID	DIVISION	ASSET CATEGORY	ASSET SUB CATEGORY	ASSET DESCRIPTION	IN-SERVICE YEAR	REPLACEMENT VALUATION (2013)
WATER TREATMENT PLANT - LONG SAULT						
LSWTPB	Long Sault/Ingleside Water	Infrastructure	Buildings	Building - Long Sault Water Treatment Plant	2005	$ 6,612,208.90
LSWTPE	Long Sault/Ingleside Water	General Capital	Equipment	Process Equipment - Long Sault Water Treatment Plant	2005	$ 4,376,803.46
LSWTPS	Long Sault/Ingleside Water	Infrastructure	Land Improvement	Siteworks - Long Sault Water Treatment Plant	2005	$ 167,244.79
					Total	**$ 11,156,257.16**
LOW LIFT PUMPING STATION (WATER TREATMENT PLANT) - LONG SAULT						
LSLIFTSTNB	Long Sault/Ingleside Water	Infrastructure	Buildings	Building - Long Sault Low Lift Pumping Station	2005	$ 614,423.60
LSLIFTSTNE	Long Sault/Ingleside Water	General Capital	Equipment	Process Equipment - Long Sault Low Lift Pumping Station	2005	$ 804,808.38
LSLIFTSTNS	Long Sault/Ingleside Water	Infrastructure	Land Improvement	Siteworks - Long Sault Low Lift Pumping Station	2005	$ 23,076.93
					Total	**$ 1,442,308.91**
INGLESIDE BOOSTER STATION - INGLESIDE						
IBSTNB	Long Sault/Ingleside Water	Infrastructure	Buildings	Building - Ingleside Booster Station	2005	$ 614,423.60
IBSTNE	Long Sault/Ingleside Water	General Capital	Equipment	Process Equipment - Ingleside Booster Station	2005	$ 804,808.38
IBSTNS	Long Sault/Ingleside Water	Infrastructure	Land Improvement	Siteworks - Ingleside Booster Station	2005	$ 23,076.93
					Total	**$ 1,442,308.91**
WATER TOWER - INGLESIDE						
TOWERWIB	Long Sault/Ingleside Water	Infrastructure	Buildings	Building - Ingleside Water Tower	1957	$ 490,899.88
TOWERWIS	Long Sault/Ingleside Water	General Capital	Land Improvement	Siteworks - Ingleside Water Tower Fence	1983	$ 14,568.56
TOWERWIS1	Long Sault/Ingleside Water	General Capital	Land Improvement	Siteworks - Ingleside Water Tower, Parking Lot	1957	$ 1,230.90
					Total	**$ 506,699.34**
WATER TREATMENT PLANT - NEWINGTON						
NWTPB	Newington Water	Infrastructure	Buildings	Building - Newington Water Treatment Plant	1989	$ 379,816.66
NWTPE	Newington Water	General Capital	Equipment	Process Equipment - Newington Water Treatment Plant	1989	$ 289,967.56
NWTPE2	Newington Water	General Capital	Equipment	Process Equipment - Newington Water Treatment Plant	2005	$ 425,671.36
NWTPS	Newington Water	Infrastructure	Land Improvement	Siteworks - Newington Water Treatment Plant	1989	$ 10,890.80
					Total	**$ 1,106,346.38**
SEWAGE TREATMENT PLANT - LONG SAULT						
LSSTPB	Long Sault Sewer	Infrastructure	Buildings	Building - Long Sault Sewage Treatment Plant	1993	$ 4,177,878.58
LSSTPE	Long Sault Sewer	General Capital	Equipment	Process Equipment - Long Sault Sewage Treatment Plant	1993	$ 5,472,432.51
LSSTPS	Long Sault Sewer	Infrastructure	Land Improvement	Siteworks - Long Sault Sewage Treatment Plant	1993	$ 156,915.63
LSLIFTSTNB	Long Sault Sewer	Infrastructure	Buildings	Building - Long Sault Lift Station	1993	$ 441,248.76
LSLIFTSTNE	Long Sault Sewer	General Capital	Equipment	Process Equipment - Long Sault Lift Station	1993	$ 577,973.73
LSLIFTSTNS	Long Sault Sewer	Infrastructure	Land Improvement	Siteworks - Long Sault Sewage Lift Station	1993	$ 16,572.72
					Total	**$ 10,843,021.92**
SEWAGE TREATMENT PLANT - INGLESIDE						
ISTPB	Ingleside Sewer	Infrastructure	Buildings	Building - Ingleside Sewage Treatment Plant	1993	$ 7,310,563.64
ISTPE	Ingleside Sewer	General Capital	Equipment	Process Equipment - Ingleside Sewage Treatment Plant	1993	$ 9,575,808.70
ISTPS	Ingleside Sewer	Infrastructure	Land Improvement	Siteworks - Ingleside Sewage Treatment Plant	1993	$ 274,575.17
ILIFTSTNB	Ingleside Sewer	Infrastructure	Buildings	Building - Ingleside Lift Station	1993	$ 905,148.22
ILIFTSTNE	Ingleside Sewer	General Capital	Equipment	Process Equipment - Ingleside Lift Station	1993	$ 1,185,616.67
ILIFTSTNS	Ingleside Sewer	Infrastructure	Land Improvement	Siteworks - Ingleside Lift Station	1993	$ 33,996.18
IWWFUGEB	Ingleside Sewer	Infrastructure	Buildings	Building - Ingleside Waste Water Treatment Centre Fuge	1993	$ 514,828.48
IWWFUGEE	Ingleside Sewer	General Capital	Equipment	Process Equipment - Ingleside Waste Water Treatment Centre Fuge	1993	$ 674,352.79
IWWFUGES	Ingleside Sewer	Infrastructure	Land Improvement	Siteworks - Ingleside Waste Water Treatment Centre Fuge	1993	$ 19,336.28
					Total	**$ 20,494,226.12**
WATER TOWER - ST.ANDREWS						
TOWERWSAB	Eamers Corners/ St.Andrews Water	Infrastructure	Buildings	Building - St. Andrews Water Tower	1991	$ 424,411.76
TOWERWSAS	Eamers Corners/ St.Andrews Water	General Capital	Land Improvement	Siteworks - St. Andrews Water Tower Parking Lot	1991	$ 11,341.62
					Total	**$ 435,753.38**
BOOSTER STATION - EAMERS CONVERS/ST.ANDREWS						
SABSTNB	Eamers Corners/ St.Andrews Water	Infrastructure	Buildings	Building - St. Andrews Booster Station	2004	$ 248,077.50
SABSTNE	Eamers Corners/ St.Andrews Water	General Capital	Equipment	Process Equipment - St. Andrews Booster Station	2004	$ 147,186.68
					Total	**$ 395,264.18**

APPENDIX B

NET BOOK VALUE OF ASSETS

TABLE B.1 – NET BOOK VALUE OF BRIDGES AND ROAD ASSETS

ASSET TYPE	BOOK COST	DEPRECIATION	NET BOOK VALUE
Roads			
Road Base	14,663,203.55	5,186,011.25	9,477,192.30
Road Surface	6,790,045.63	4,909,365.69	1,880,679.94
Sidewalks	378,929.42	246,502.64	132,426.78
Storm Drains	251,933.00	84,319.31	167,613.69
Guiderails	228,888.05	101,826.58	127,061.47
Roads Total			**11,784,974.18**
Bridges	5,027,944.33	1,105,414.40	**3,922,529.93**
TOTAL			**15,707,504.11**

TABLE B.2 – NET BOOK VALUE OF WATER DISTRIBUTION ASSETS

ASSET TYPE	BOOK COST	DEPRECIATION	NET BOOK VALUE
Long Sault & Ingleside			
Water Mains	9,011,890.00	1,326,719.21	7,685,170.79
Hydrants	508,938.57	116,658.89	392,279.68
Water Valves	234,463.46	89,576.82	144,886.64
Water Meters	354,339.00	277,575.61	76,763.39
Eamers Corners & St. Andrews			
Water Mains	2,250,731.00	494,888.58	1,755,842.42
Hydrants	409,759.00	120,348.26	289,410.74
Water Valves	361,733.00	159,820.10	201,912.90
Water Meters	121,116.00	96,929.42	24,186.58
Maintenance Access	1,977.00	578.70	1,398.30
Newington			
Water Mains	108,928.00	29,409.55	79,518.45
Hydrants	4,801.00	1,728.02	3,072.98
Water Valves	29,648.87	14,027.06	15,621.81
TOTAL			**10,670,064.68**

TABLE B.3 – NET BOOK VALUE OF SANITARY SEWER ASSETS

ASSET TYPE	BOOK COST	DEPRECIATION	NET BOOK VALUE
Long Sault			
Sewer Mains	1,593,721.00	336,614.09	1,257,106.91
Maintenance Access	180,046.00	50,373.68	129,672.32
Ingleside Sewer			
Sewer Mains	674,719.00	292,534.92	382,184.08
Maintenance Access	102,196.00	42,919.67	59,276.33
TOTAL			**1,828,239.64**

TABLE B.4 – NET BOOK VALUE OF SEWER AND WATER TREATMENT PLANT ASSETS

ASSET TYPE	BOOK COST	DEPRECIATION	NET BOOK VALUE
Long Sault & Ingleside Water			
Buildings	6,056,801.00	1,267,409.74	4,789,391.26
Equipment	4,689,263.71	1,839,205.11	2,850,058.60
Eamers Corners & St. Andrews Water			
Buildings	470,972.00	189,226.04	281,745.96
Equipment	119,190.00	48,150.00	71,040.00
Newington Water			
Buildings	226,045.00	135,626.22	90,418.78
Equipment	548,740.50	305,479.97	243,260.53
Water Treatment Plants Total			**8,325,915.13**
Long Sault Sewer			
Buildings	2,310,307.00	1,155,151.22	1,155,155.78
Equipment	3,094,070.15	3,035,489.71	58,580.44
Ingleside Sewer			
Buildings	4,366,670.00	2,183,335.52	2,183,334.48
Equipment	5,810,094.90	5,733,159.49	76,935.41
Sewage Treatment Plants Total			**3,474,006.11**
TOTAL			**11,799,921.24**

APPENDIX C

LIFE-CYCLE ANALYSIS FOR ROADS BY SURFACE TYPE

TABLE C.1 – IDEAL LIFECYCLE FOR LOW COST BITUMINOUS (LCB) – RURAL ROADS (R)

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 0	LCB-R3	**10.00**	$ 448,000
Year 1		9.53	
Year 2		9.06	
Year 3		8.59	
Year 4		8.12	
Year 5		7.65	
Year 6		7.18	
Year 7		6.71	
Year 8	LCB-R1	**8.24**	$ 23,000
Year 9		7.77	
Year 10		7.30	
Year 11		6.83	
Year 12		6.36	
Year 13		5.89	
Year 14		5.42	
Year 15		4.95	
Year 16		4.48	
Year 17		4.01	
Year 18		3.54	
Year 19	LCB-R2	**9.00**	$ 126,000
Year 20		8.53	
Year 21		8.06	
Year 22		7.59	
Year 23		7.12	
Year 24		6.65	
Year 25	LCB-R1	**8.18**	$ 23,000
Year 26		7.71	
Year 27		7.24	
Year 28		6.77	
Year 29		6.30	
Year 30		5.83	
Year 31		5.36	
Year 32		4.89	
Year 33		4.42	
Year 34		3.95	
Year 35		3.48	
Year 36	LCB-R2	**9.00**	$ 126,000
Year 37		8.53	
Year 38		8.06	
Year 39		7.59	
Year 40		7.12	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 41		6.65	
Year 42	LCB-R1	**8.18**	$ 23,000
Year 43		7.71	
Year 44		7.24	
Year 45		6.77	
Year 46		6.30	
Year 47		5.83	
Year 48		5.36	
Year 49		4.89	
Year 50		4.42	
Year 51		3.95	
Year 52		3.48	
Year 53		3.01	
Year 54		2.54	
Year 55		2.07	
AVERAGE		**6.45**	**$ 13,982**

TABLE C.2 – IDEAL LIFECYCLE FOR HIGH COST BITUMINOUS (HCB) – RURAL ROADS(R)

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 0	HCB-R3	**10.00**	$ 569,000
Year 1		9.77	
Year 2		9.54	
Year 3		9.31	
Year 4		9.08	
Year 5		8.85	
Year 6		8.62	
Year 7		8.39	
Year 8	HCB-R6	**8.91**	$ 10,000
Year 9		8.68	
Year 10		8.45	
Year 11		8.22	
Year 12		7.99	
Year 13		7.76	
Year 14		7.53	
Year 15		7.30	
Year 16		7.07	
Year 17		6.84	
Year 18		6.61	
Year 19		6.38	
Year 20	HCB-R1	**9.15**	$ 95,000
Year 21		8.92	
Year 22		8.69	
Year 23		8.46	
Year 24	HCB-R4	**8.98**	$ 4,000
Year 25		8.75	
Year 26		8.52	
Year 27		8.29	
Year 28	HCB-R6	**8.81**	$ 10,000
Year 29		8.58	
Year 30		8.35	
Year 31		8.12	
Year 32		7.89	
Year 33		7.66	
Year 34		7.43	
Year 35		7.20	
Year 36		6.97	
Year 37		6.74	
Year 38		6.51	
Year 39		6.28	
Year 40		6.05	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 41		5.82	
Year 42		5.59	
Year 43		5.36	
Year 44		5.13	
Year 45		4.90	
Year 46		4.67	
Year 47		4.44	
Year 48		4.21	
Year 49		3.98	
Year 50		3.75	
Year 51		3.52	
Year 52	HCB-R2	**9.00**	$ 193,000
Year 53		8.77	
Year 54		8.54	
Year 55		8.31	
Year 56		8.08	
Year 57		7.85	
Year 58		7.62	
Year 59		7.39	
Year 60	HCB-R6	**7.91**	$ 10,000
Year 61		7.68	
Year 62		7.45	
Year 63		7.22	
Year 64		6.99	
Year 65		6.76	
Year 66		6.53	
Year 67		6.30	
Year 68	HCB-R1	**9.07**	$ 95,000
Year 69		8.84	
Year 70		8.61	
Year 71		8.38	
Year 72	HCB-R4	**8.90**	$ 4,000
Year 73		8.67	
Year 74		8.44	
Year 75		8.21	
Year 76	HCB-R6	**8.73**	$ 10,000
Year 77		8.50	
Year 78		8.27	
Year 79		8.04	
Year 80		7.81	
Year 81		7.58	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 82		7.35	
Year 83		7.12	
Year 84		6.89	
Year 85		6.66	
Year 86		6.43	
Year 87		6.20	
Year 88		5.97	
Year 89		5.74	
Year 90		5.51	
Year 91		5.28	
Year 92		5.05	
Year 93		4.82	
Year 94		4.59	
Year 95		4.36	
Year 96		4.13	
Year 97		3.90	
Year 98		3.67	
Year 99		3.44	
Year 100		3.21	
AVERAGE		**7.17**	**$ 10,000**

TABLE C.3 – IDEAL LIFECYCLE FOR HIGH COST BITUMINOUS (HCB) – SEMI-URBAN ROADS (S)

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 0	HCB-S3	**10.00**	$ 880,000
Year 1		9.77	
Year 2		9.54	
Year 3		9.31	
Year 4		9.08	
Year 5		8.85	
Year 6		8.62	
Year 7		8.39	
Year 8	HCB-S6	**8.91**	$ 10,000
Year 9		8.68	
Year 10		8.45	
Year 11		8.22	
Year 12		7.99	
Year 13		7.76	
Year 14		7.53	
Year 15		7.30	
Year 16		7.07	
Year 17		6.84	
Year 18		6.61	
Year 19		6.38	
Year 20	HCB-S1	**9.15**	$ 124,000
Year 21		8.92	
Year 22		8.69	
Year 23		8.46	
Year 24	HCB-S4	**8.98**	$ 4,000
Year 25		8.75	
Year 26		8.52	
Year 27		8.29	
Year 28	HCB-S6	**8.81**	$ 10,000
Year 29		8.58	
Year 30		8.35	
Year 31		8.12	
Year 32		7.89	
Year 33		7.66	
Year 34		7.43	
Year 35		7.20	
Year 36		6.97	
Year 37		6.74	
Year 38		6.51	
Year 39		6.28	
Year 40		6.05	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 41		5.82	
Year 42		5.59	
Year 43		5.36	
Year 44		5.13	
Year 45		4.90	
Year 46		4.67	
Year 47		4.44	
Year 48		4.21	
Year 49		3.98	
Year 50		3.75	
Year 51		3.52	
Year 52	HCB-S2	**9.00**	$ 267,000
Year 53		8.77	
Year 54		8.54	
Year 55		8.31	
Year 56		8.08	
Year 57		7.85	
Year 58		7.62	
Year 59		7.39	
Year 60	HCB-S6	**7.91**	$ 10,000
Year 61		7.68	
Year 62		7.45	
Year 63		7.22	
Year 64		6.99	
Year 65		6.76	
Year 66		6.53	
Year 67		6.30	
Year 68	HCB-S1	**9.07**	$ 124,000
Year 69		8.84	
Year 70		8.61	
Year 71		8.38	
Year 72	HCB-S4	**8.90**	$ 4,000
Year 73		8.67	
Year 74		8.44	
Year 75		8.21	
Year 76	HCB-S6	**8.73**	$ 10,000
Year 77		8.50	
Year 78		8.27	
Year 79		8.04	
Year 80		7.81	
Year 81		7.58	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 82		7.35	
Year 83		7.12	
Year 84		6.89	
Year 85		6.66	
Year 86		6.43	
Year 87		6.20	
Year 88		5.97	
Year 89		5.74	
Year 90		5.51	
Year 91		5.28	
Year 92		5.05	
Year 93		4.82	
Year 94		4.59	
Year 95		4.36	
Year 96		4.13	
Year 97		3.90	
Year 98		3.67	
Year 99		3.44	
Year 100		3.21	
AVERAGE		**7.17**	**$ 14,430**

TABLE C.4 – IDEAL LIFECYCLE FOR HIGH COST BITUMINOUS (HCB) – URBAN ROADS (U)

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 0	HCB-U3	**10.00**	$ 1,231,000
Year 1		9.77	
Year 2		9.54	
Year 3		9.31	
Year 4	HCB-U4	**9.83**	$ 10,000
Year 5		9.60	
Year 6		9.37	
Year 7		9.14	
Year 8	HCB-U6	**9.66**	$ 14,000
Year 9		9.43	
Year 10		9.20	
Year 11		8.97	
Year 12		8.74	
Year 13		8.51	
Year 14		8.28	
Year 15		8.05	
Year 16		7.82	
Year 17		7.59	
Year 18		7.36	
Year 19		7.13	
Year 20		6.90	
Year 21		6.67	
Year 22		6.44	
Year 23		6.21	
Year 24	HCB-U1	**8.98**	$ 197,000
Year 25		8.75	
Year 26		8.52	
Year 27		8.29	
Year 28	HCB-U4	**8.81**	$ 10,000
Year 29		8.58	
Year 30		8.35	
Year 31		8.12	
Year 32	HCB-U6	**8.64**	$ 14,000
Year 33		8.41	
Year 34		8.18	
Year 35		7.95	
Year 36		7.72	
Year 37		7.49	
Year 38		7.26	
Year 39		7.03	
Year 40		6.80	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 41		6.57	
Year 42		6.34	
Year 43		6.11	
Year 44		5.88	
Year 45		5.65	
Year 46		5.42	
Year 47		5.19	
Year 48		4.96	
Year 49		4.73	
Year 50		4.50	
Year 51		4.27	
Year 52		4.04	
Year 53		3.81	
Year 54		3.58	
Year 55		3.35	
Year 56	HCB-U2	**9.00**	$ 441,000
Year 57		8.77	
Year 58		8.54	
Year 59		8.31	
Year 60	HCB-U4	**8.83**	$ 4,000
Year 61		8.60	
Year 62		8.37	
Year 63		8.14	
Year 64	HCB-U6	**8.66**	$ 14,000
Year 65		8.43	
Year 66		8.20	
Year 67		7.97	
Year 68		7.74	
Year 69		7.51	
Year 70		7.28	
Year 71		7.05	
Year 72		6.82	
Year 73		6.59	
Year 74		6.36	
Year 75	HCB-U1	**9.13**	$ 197,000
Year 76		8.90	
Year 77		8.67	
Year 78		8.44	
Year 79	HCB-U4	**8.96**	$ 4,000
Year 80		8.73	
Year 81		8.50	

YEAR	RECONST. TYPE	CONDIT'N RATING	$$$/KM
Year 82		8.27	
Year 83	HCB-U6	**8.79**	$ 14,000
Year 84		8.56	
Year 85		8.33	
Year 86		8.10	
Year 87		7.87	
Year 88		7.64	
Year 89		7.41	
Year 90		7.18	
Year 91		6.95	
Year 92		6.72	
Year 93		6.49	
Year 94		6.26	
Year 95		6.03	
Year 96		5.80	
Year 97		5.57	
Year 98		5.34	
Year 99		5.11	
Year 100		4.88	
AVERAGE		**7.52**	**$ 21,500**

APPENDIX D

BACKLOG OF NEEDS

TABLE D.1 – BACKLOG OF ROAD NEEDS

No.	STREET	FROM	TO	Km
002	Lefebvre Road	Island Road	County Road 18	0.10
012	McPhail Road	Delaney Road	0.4km west of Delaney Road	0.40
019	DeWit Road	County Road 18	Dead End	0.50
020	Willis Street	County Road 18	Haughton Street	0.10
021	Haughton Street	Willis Street	Dead End	0.20
022	Carleton Street	Highway 138	Dead End	0.15
023	Fraser Street	County Road 18	Dead End	0.30
024	McIntosh Road	County Road 18	Dead End	0.20
033	Headline Road	2.5km east of County Road 33	Highway 138	0.40
035	Cedarview Road	Headline Road	Dead End	0.40
036	Marl Road	Cedarview Road	Dead End	0.10
037	Poplar Avenue	Headline Road	Beaver Dam Road	0.50
038	Beaver Dam Road	Poplar Avenue	County Road 33	1.20
039	Equestrian Road	Beaver Dam Road	Beaver Dam Road	0.50
043	Quail Road	Highway 138	Dead End	2.60
044	MacMillan Corners Road	Highway 138	Edge of North Stormont Boundary	0.90
045	Willy Allan Road	Highway 138	3.5km west of Hwy 138	3.50
049	Black River Road	County Road 15	County Road 18	2.85
056	O'Keefe Road	Myers Road	Wheeler Road	1.85
057	O'Keefe Road	Maloney Road	Valade Road	1.35
058	Wheeler Road	Highway 138	O'Keefe Road	1.60
059	Maloney Road	O'Keefe Road	County Road 18	3.20
060	Myers Road	County Road 15	4.0km east of County Road 15	4.00
063	Cornett Lane	Myers Road	Dead End	0.40
070	Central Road	Northfield Road	Dead End (Laneway)	0.10
077	Dixon Road	MacRae Road	County Road 12	2.80
078	Bilmer Road	Dixon Road	Dead End	0.10
080	North Lunenburg Road East	County Road 12	Northfield Road	1.90
083	Helmer Road	Hoople Seventh Road	Dead End (Laneway)	0.50
085	Saving Street	County Road 14	2.3km east of County Road 14	2.30
088	Eaman Road	1.7km west of County Road 12	County Road 14	3.50
096A	Rombough Road	County Road 18	Pleasant Valley Road	1.10
100	Elijh/Beckstead Road	County Road 14	3.5 km West of County Road 14	3.50
102A	Bruning Road	Elijh/Beckstead Road	0.4km North	0.40
104	Duffy's Road	County Road 14	Morgan Road	1.20
105A	Morgan Road	County Road 18	Duffy's Road	0.30
106	North Valley Road	Otto Road	Elijh/Beckstead Road	2.80
111A	Sandtown Road	County Road 12	1.5km west of County Road 12	1.50
111B	Sandtown Road	1.5km west of County Road 12	May Road	1.90
115	Hunters Road	County Road 12	County Road 11	7.80
123A	Aultsville Road	County Road 18	1.0km south of County Road 18	1.00
124B	N. Lunenburg Road, West	0.9km west of County Road 12	County Road 12	0.90
124C	North Lunenburg Road West	County Road 14	0.8km east of County Road 14	0.80
127	Cooper Road	County Road 12	2.0km west of County Road 12	2.00

TABLE D.1 – BACKLOG OF ROAD NEEDS (cont.)

No.	STREET	FROM	TO	Km
135A	Finch-Osnabruck Boundary Road	Dead End	St. Luke's Road	1.00
136	Fairground Drive	County Road 14	Elm Street	0.20
137	Elm Street	Fairground Drive	County Road 14	0.40
138	Ash Street	County Road 14	Fairground Drive	0.40
139	Mill Street	Elm Street	County Road 14	0.20
140	Duval Street	County Road 14	Ash Street	0.10
151	Farron's Point Road	1.3 km North of County Road 2	Dead End (@ CNR Line)	0.30
152	Anderson Road	Farron's Point Road	Aultsville Road	3.50
153	Anderson Road	Aultsville Road	Edge of South Dundas Boundary	1.80
154	Anderson Road	Edge of South Dundas Boundary	Nudell Bush Road	0.20
155	Ault Island Road	County Road 2	Willbruck Drive	1.80
156	Willbruck Drive	Ault Island Road	Dead End	1.80
157	McLeod Road	County Road 2	Dead End	0.20
158	Kilarney Avenue	County Road 2	St. Lawrence Street	0.10
160	Napier Street	St. Lawrence Street	Dead End	0.20
161	St. Lawrence Street	Dead End @ West End	Dickinson Drive	1.40
162	Thorold Lane	Dickinson Drive	Bank Street	0.20
163	Maple Street	Bank Street	Farran Road	0.15
165	Maple Street	Farran Drive	Dickinson Drive	0.35
166	Bank Street	County Road 2	Maple Street	0.30
169	Shaver Road	Colonial Road	0.7 km North	0.70
171	Shaver Road	Colonial Road	County Road 2	0.15
174B	Wildwood Street	Ault Street	Dead End	0.15
176	Hickory Street	Ault Street	Farran Drive	0.70
180	College Street	Farran Drive	Dickinson Drive	0.40
185	Wales Drive	Dead End	County Road 2	0.60
188	Santa Cruz	Woodlands Road	100m W of Woodlands Road	0.10
189	Santa Cruz	100m west of Woodlands Road	Dickinson Drive	0.55
191	Dale Street	Manning Road	Moak Street	0.50
192	Moak Street	Dale Street	David Street	0.15
197	Mille Roches Road	Cherry Street	County Road 36	0.70
211	Kent Crescent	Bethune Avenue	Bethune Avenue	0.45
212	Dixon Avenue	Bethune Avenue	Kent Crescent	0.10
213	Robin Road	County Road 2	Dead End	0.20
214	Moulinette Island Causeway	Long Sault Parkway	Lakeside Drive	1.20
218	Chantine Drive	Dead End West	Dead End East	0.60
223	Algonquin Drive	County Road 2	Dead End	0.40
224	Saskatchewan Drive	Alonquin Avenue	Columbia Avenue	0.15
226	Thompson Drive	Dead End	County Road 15	0.20
227	Moss Drive	County Road 15	Jenkins Road	0.35
228	Jenkins Road	Dead End	County Road 15	0.30

TABLE D.2 – BACKLOG OF SANITARY SEWER NEEDS

Asset ID	Street	Length (m)	Diameter (mm)	Material
001	Napier St.	110.0	450	PVC
002	Napier St.	117.7	450	PVC
005	Piercy St.	73.8	200	CONC
009	Piercy St.	64.8	200	CONC
010	St Lawrence St.	88.1	200	PVC
013	St Lawrence St.	62.5	200	PVC
014	St Lawrence St.	87.0	200	PVC
016	St Lawrence St.	115.6	200	PVC
031	St Lawrence St.	115.1	250	AC
032	St Lawrence St.	114.7	200	PVC
036	St Lawrence St.	101.1	250	AC
039	St Lawrence St.	95.0	300	AC
044	Woodlands Dr.	92.1	200	PVC
046	Santa Cruz Dr.	118.6	200	VC
049	Santa Cruz Dr.	102.7	200	VC
050	Santa Cruz Dr.	114.6	200	VC
053	Wales Dr.	110.2	200	VC
054	Wales Dr.	129.6	200	VC
055	Hoople St.	96.3	200	AC
058	Hoople St.	95.0	200	AC
064	Elm St.	121.0	200	VC
065	Maxwell Ave.	108.2	200	VC
067	Maxwell Ave.	109.2	200	VC
068	Maxwell Ave.	96.0	200	VC
070	Dickinson	112.1	250	AC
071	Dickinson	117.5	250	AC
074	Maple St.	98.7	200	VC
075	Maple St.	83.2	200	VC
076	Maple St.	83.9	200	VC
078	Maple St.	21.1	200	VC
079	Maple St.	27.0	200	VC
083	Maple St.	109.1	200	VC
084	Maple St.	98.2	200	VC
085	Maple St.	97.7	200	VC
104	Dickinson Rd	168.2	150	PVC
105	Dickinson Rd	55.7	150	PVC
107	Dickinson Rd	120.7	250	AC
108	Dickinson Rd	83.5	250	AC
114	College St.	77.9	200	VC
119	Memorial Sq.	78.4	200	VC
129	Pine St.	106.9	200	VC
130	Pine St.	75.2	200	VC
131	Pine St.	76.1	200	VC

TABLE D.2 – BACKLOG OF SANITARY SEWER NEEDS (cont.)

Asset ID	Street	Length (m)	Diameter (mm)	Material
132	Pine St.	72.7	200	VC
133	Pine St.	73.4	200	VC
134	Ault Dr.	111.0	200	PVC
136	Ault Dr.	111.6	200	PVC
155	Hickory St.	110.7	200	AC
158	Spruce St.	86.7	200	AC
159	Spruce St.	85.8	200	AC
160	Spruce St.	68.8	200	AC
161	Spruce St.	120.0	200	AC
175	Strachan Ave.	88.1	250	VC
176	Strachan Ave.	94.8	250	VC
177	Strachan Ave.	88.3	250	VC
188	Manning Rd.	71.7	250	AC
192	Simcoe St.	37.4	250	VC
194	Simcoe St.	45.1	250	VC
201	Bethune Ave.	97.2	250	VC
203	Bethune Ave.	90.7	250	VC
206	Bethune Ave.	88.0	250	VC
211	Kent Cr.	90.2	250	VC
213	Milles Roches Rd.	106.2	375	VC
217	Milles Roches Rd.	89.0	375	VC
219	Milles Roches Rd.	86.8	375	VC
220	Frost Ave.	94.9	375	VC
221	Frost Ave.	105.5	250	VC
223	Frost Ave.	103.3	250	VC
224	Frost Ave.	91.2	250	VC
226	Saunders Ave.	91.6	250	VC
227	Saunders Ave.	92.5	250	VC
231	St Laurent Ave.	87.9	250	VC
234	St Laurent Ave.	84.9	250	VC
235	Saunders Ave.	52.5	250	VC
236	Saunders Ave.	82.7	250	VC
244	Cherry Ouellette	64.9	250	AC
249	Ouellette Ave.	108.7	250	AC
262	Johnson Cr.	96.9	250	VC
267	Johnson Cr.	93.9	250	VC
275	Plaza St.	39.2	200	PVC
312	Forest Hill Dr.	76.3	200	PVC
313	Forest Hill Dr.	91.1	200	PVC
315	Forest Hill Dr.	38.4	200	PVC
318	Forest Hill Dr.	120.2	200	PVC
319	Forest Hill Dr.	120.9	200	PVC

APPENDIX E

FINANCIAL MODELS

TABLE E.1 – FINANCIAL PLAN FOR BRIDGES AND ROAD INFRASTRUCTURE ($)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CAPITAL EXPENDITURE										
from table E.2										
ROAD CONSTRUCTION	880,800	865,500	916,864	960,012	979,440	1,042,608	990,480	1,088,720	1,066,624	1,293,732
ROAD CONSTRUCTION TO ACHIEVE OPTIMUM RATING	1,116,300	1,116,300	1,160,952	1,205,604	1,250,256	1,294,908	1,339,560	1,384,212	1,428,864	1,473,516
BRIDGES AND CULVERTS	2,000	10,000	35,360	456,840	431,200	61,480	462,000	9,920	2,560	13,200
TOTAL CAPITAL EXPENDITURE	**1,999,100**	**1,991,800**	**2,113,176**	**2,622,456**	**2,660,896**	**2,398,996**	**2,792,040**	**2,482,852**	**2,498,048**	**2,780,448**
FUNDING										
Reserves	600,000	600,000	600,000	600,000	700,000	700,000	700,000	700,000	700,000	700,000
Grants										
Federal Gax Tax Funding	384,050	384,050	384,050	384,050	384,050	384,050	384,050	384,050	384,050	384,050
Development Charges	0	0	0	0	0	0	0	0	0	0
Long term debt proceeds	0	0	0	0	0	0	0	0	0	0
Committed										
Annual debt repayment	0	0	0	0	0	0	0	0	0	0
TOTAL FUNDING SOURCES	**984,050**	**984,050**	**984,050**	**984,050**	**1,084,050**	**1,084,050**	**1,084,050**	**1,084,050**	**1,084,050**	**1,084,050**
FUNDING SHORTFALL	-1,015,050	-1,007,750	-1,129,126	-1,638,406	-1,576,846	-1,314,946	-1,707,990	-1,398,802	-1,413,998	-1,696,398
CONTINUITY OF RESERVES										
Opening Balance	0	0	18,000	54,900	111,634	89,172	86,520	104,682	144,700	207,656
Allocated from current year revenues	600,000	618,000	636,540	655,636	675,305	695,564	716,431	737,924	760,062	782,864
increase by 2% inflation 1 % growth										
Allocation of investment income	0	0	360	1,098	2,233	1,783	1,730	2,094	2,894	4,153
Deduct										
Funding for capital projects	-600,000	-600,000	-600,000	-600,000	-700,000	-700,000	-700,000	-700,000	-700,000	-700,000
Closing Balance	0	18,000	54,900	111,634	89,172	86,520	104,682	144,700	207,656	294,673
Interest income - Bank prime-1%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Tax levy 1 % increase raises	46,640	48,039	49,480	50,965	52,494	54,069	55,691	57,361	59,082	60,855
compounding effect of 2% increase for										
inflation and 1 % for growth	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%

TABLE E.2 – CAPITAL EXPENDITURES FOR BRIDGES AND ROAD INFRASTRUCTURE ($)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ROAD CONSTRUCTION										
Current spending as outlined in section 4.3.1.2	880,800	865,500	881,600	888,900	874,500	898,800	825,400	878,000	833,300	980,100
Adjusted for Inflation			35,264	71,112	104,940	143,808	165,080	210,720	233,324	313,632
TOTAL ROAD CONSTRUCTION	**880,800**	**865,500**	**916,864**	**960,012**	**979,440**	**1,042,608**	**990,480**	**1,088,720**	**1,066,624**	**1,293,732**
ROAD CONSTRUCTION TO ACHIEVE OPTIMUM RATING										
Additional spending as outlined in section 4.3.1.3	1,116,300	1,116,300	1,116,300	1,116,300	1,116,300	1,116,300	1,116,300	1,116,300	1,116,300	1,116,300
Adjusted for Inflation			44,652	89,304	133,956	178,608	223,260	267,912	312,564	357,216
TOTAL ADDITIONAL ROAD CONSTRUCTION	**1,116,300**	**1,116,300**	**1,160,952**	**1,205,604**	**1,250,256**	**1,294,908**	**1,339,560**	**1,384,212**	**1,428,864**	**1,473,516**
BRIDGES AND CULVERTS										
As outlined in section 4.3.2.2	2,000	10,000	34,000	423,000	385,000	53,000	385,000	8,000	2,000	10,000
Adjusted for Inflation			1,360	33,840	46,200	8,480	77,000	1,920	560	3,200
TOTAL BRIDGES AND CULVERTS	**2,000**	**10,000**	**35,360**	**456,840**	**431,200**	**61,480**	**462,000**	**9,920**	**2,560**	**13,200**

TABLE E.3 – HISTORICAL REVENUES AND EXPENDITURES FOR BRIDGES AND ROAD INFRASTRUCTURE ($)

	2010	2011	2012	2013
				BUDGET
OPERATING REVENUES				
MNR Pits & Quarries	60,512	54,792	108,110	60,000
User Charges	9,053	13,432	12,073	13,400
TOTAL OPERATING REVENUES	**69,565**	**68,224**	**120,183**	**73,400**
OPERATING EXPENDITURES				
Operating/Fleet/Garage	575,301	664,962	785,483	742,308
Bridges & culverts	63,672	69,952	65,044	65,000
Paved Roads	41,334	72,431	78,187	125,500
Unpaved Roads	348,427	427,449	417,704	467,000
Winter control	345,019	395,064	532,627	426,500
Streetlighting	127,429	125,947	139,720	140,000
Roadside - signs, brushing, ditching	191,494	169,814	133,613	185,000
TOTAL OPERATING EXPENDITURES	**1,692,676**	**1,925,619**	**2,152,378**	**2,151,308**
ROAD OPERATIONS NET REVENUES	**-1,623,111**	**-1,857,395**	**-2,032,195**	**-2,077,908**
CAPITAL REVENUES				
Proceeds of Debt	0	0	0	838,652
Federal Gas Tax Funding	385,296	384,051	384,051	549,200
User charges	0	0	49,034	0
Sale of equipment	0	0	40,091	0
Infrastructure Funding	517,221	134,967	627,427	431,348
TOTAL CAPITAL REVENUES	**902,517**	**519,018**	**1,100,603**	**1,819,200**
CAPITAL EXPENDITURES				
Road Infrastructure	1,334,455	1,041,752	1,529,076	2,072,789
Road Equipment	280,065	171,261	313,413	313,229
Road Facilities	9,904	442,500	2,982	23,722
TOTAL CAPITAL EXPENDITURES	**1,624,424**	**1,655,513**	**1,845,471**	**2,409,740**
LONG TERM DEBT PAYMENT	0	0	0	0
ROAD CAPITAL NET REVENUES	**-721,907**	**-1,136,495**	**-744,868**	**-590,540**

TABLE E.4 – FINANCIAL PLAN FOR SEWER AND WATER INFRASTRUCTURE ($)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CAPITAL EXPENDITURE										
from table E.5										
WATER MAIN RECONSTRUCTION	0	184,000	179,920	0	0	0	0	223,200	230,400	237,600
SEWER COLLECTION SYSTEM	80,840	285,300	292,344	49,745	112,000	50,182	37,944	69,093	93,773	132,000
WATER TREATMENT AND SEWAGE TREATMENT PLANTS	438,160	729,808	269,356	543,970	323,064	288,050	303,942	388,555	337,303	407,600
TOTAL CAPITAL EXPENDITURE	**519,000**	**1,199,108**	**741,620**	**593,715**	**435,064**	**338,232**	**341,886**	**680,848**	**661,476**	**777,200**
FUNDING										
Reserves	473,606	1,158,616	741,619	593,715	382,345	304,191	307,845	628,337	608,965	724,689
Deferred Revenue Local Improvement Charge	0	0	135,544	119,855	0	0	0	0	0	0
Grants										
Infrastructure Funding	0	0	0	0	0	0	0	0	0	0
Local Improvement Charge	547,380	542,478	361,682	361,682	361,682	343,004	343,004	343,004	343,004	343,004
Long term debt proceeds	0									
Committed										
Annual debt repayment	-501,986	-501,986	-497,225	-481,537	-308,963	-308,963	-308,963	-290,493	-290,493	-290,493
TOTAL FUNDING SOURCES	**519,000**	**1,199,108**	**741,620**	**593,715**	**435,064**	**338,232**	**341,886**	**680,848**	**661,476**	**777,200**
FUNDING SHORTFALL	0	0	0	0	0	0	0	0	0	0
CONTINUITY OF RESERVES										
Opening Balance	3,735,301	3,684,401	2,955,483	2,637,234	2,469,022	2,517,568	2,654,255	2,799,307	2,636,332	2,499,321
Allocated from current year revenues	267,000	275,010	283,260	291,758	300,511	309,526	318,812	328,376	338,228	348,374
increase by 2% inflation 1% growth										
User charge for new connections	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000
Allocation of investment income	74,706	73,688	59,110	52,745	49,380	50,351	53,085	55,986	52,727	49,986
Deduct										
Funding for capital projects	-473,606	-1,158,616	-741,619	-593,715	-382,345	-304,191	-307,845	-628,337	-608,965	-724,689
Closing Balance	3,684,401	2,955,483	2,637,234	2,469,022	2,517,568	2,654,255	2,799,307	2,636,332	2,499,321	2,253,993
Interest income - Bank prime-1%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
CONTINUITY OF DEFERRED REVENUE										
Opening Balance	722,574	767,968	808,460	672,916	553,061	605,780	639,821	673,862	726,373	778,884
Allocated from local improvement charge	45,394	40,492	0	0	52,719	34,041	34,041	52,511	52,511	52,511
Funding for debt repayment	0	0	-135,544	-119,855	0	0	0	0	0	0
Closing Balance	767,968	808,460	672,916	553,061	605,780	639,821	673,862	726,373	778,884	831,395
User rate 1% increase raises	21,000	21,630	22,279	22,947	23,636	24,345	25,075	25,827	26,602	27,400
compounding effect of 2% increase for										
inflation and 1% for growth	103%	103%	103%	103%	103%	103%	103%	103%	103%	103%

TABLE E.5 – CAPITAL EXPENDITURES FOR SEWER AND WATER INFRASTRUCTURE ($)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
WATER MAIN RECONSTRUCTION										
per section 4.3.3.2	0	184,000	173,000	0	0	0	0	180,000	180,000	180,000
Adjusted for Inflation 4%			6,920	0	0	0	0	43,200	50,400	57,600
TOTAL WATER MAIN DISTRIBUTION	**0**	**184,000**	**179,920**	**0**	**0**	**0**	**0**	**223,200**	**230,400**	**237,600**
SEWER COLLECTION SYSTEM										
per section 4.3.4.2	80,840	285,300	281,100	46,060	100,000	43,260	31,620	55,720	73,260	100,000
condition rating										
Adjusted for Inflation			11,244	3,685	12,000	6,922	6,324	13,373	20,513	32,000
TOTAL SEWER COLLECTION SYSTEM	**80,840**	**285,300**	**292,344**	**49,745**	**112,000**	**50,182**	**37,944**	**69,093**	**93,773**	**132,000**
WATER TREATMENT AND SEWAGE TREATMENT PLANTS										
per section 4.3.5.2	438,160	729,808	258,996	503,676	288,450	248,319	253,285	313,351	263,518	308,788
Adjusted for Inflation			10,360	40,294	34,614	39,731	50,657	75,204	73,785	98,812
TOTAL WATER AND SEWAGE TREATMENT PLANTS	**438,160**	**729,808**	**269,356**	**543,970**	**323,064**	**288,050**	**303,942**	**388,555**	**337,303**	**407,600**

TABLE E.6 – HISTORICAL REVENUES AND EXPENDITURES FOR SEWER AND WATER INFRASTRUCTURE ($)

	2010	2011	2012	2013
				Budget
OPERATING REVENUES				
User Charges	1,957,310	2,254,969	2,343,708	2,106,288
Provincial grants	25,000	14,191	0	0
Sewer area rate - taxation	203,824	73,712	112,649	128,943
TOTAL OPERATING REVENUES	**2,186,134**	**2,342,872**	**2,456,357**	**2,235,231**
OPERATING EXPENDITURES				
Salaries & wages	45,414	65,371	62,596	80,850
Operating and maintenance	1,339,894	1,429,446	1,530,889	1,574,771
Professional fees	0	0	0	166,500
Contracted services	641,084	664,737	684,070	696,500
TOTAL OPERATING EXPENDITURES	**2,026,392**	**2,159,554**	**2,277,555**	**2,518,621**
WATER AND SEWER NET OPERATING REVENUE	**159,742**	**183,318**	**178,802**	**-283,390**
CAPITAL REVENUES				
Proceeds of Debt	0	0	0	0
User charge for new connections	248,221	114,357	0	0
Local Improvement charge	213,632	619,910	92,207	328,725
Local improvement charge re debt	524,054	502,585	549,699	549,567
Sewer area rate - taxation		145,492	118,146	116,297
Infrastructure Funding	1,255,377	10,809	356,187	188,349
TOTAL CAPITAL REVENUES	**2,241,284**	**1,393,153**	**1,116,239**	**1,182,938**
CAPITAL EXPENDITURE				
Long Sault/Ingleside Water	272,675	103,266	761,458	282,523
Eamers Corners/St Andrews/Rosedale Terrace	1,354	12,422	14,546	0
Newington Water	25,291	10,809	29,928	0
Osnabruck Water	1,134,340	0	0	0
Long Sault Sewer	15,167	36,746	23,374	8,700
Ingleside Sewer	29,311	29,504	229,946	447,063
TOTAL OPERATING EXPENDITURES	**1,478,138**	**192,747**	**1,059,252**	**738,286**
LONG TERM DEBT REPAYMENT	**478,756**	**502,585**	**501,986**	**501,986**
WATER AND SEWER CAPITAL NET REVENUE	**284,390**	**697,821**	**-444,999**	**-57,334**